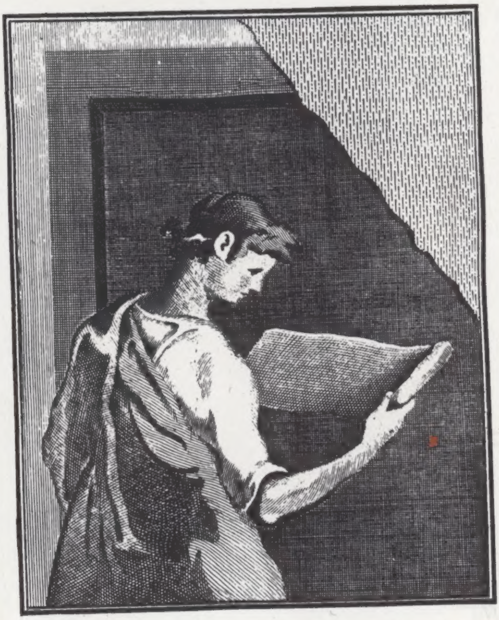

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OF
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VOL. III.

ALBANY:
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RURAL AFFAIRS:

A PRACTICAL AND COPIOUSLY

ILLUSTRATED REGISTER

OF

RURAL ECONOMY AND RURAL TASTE,

INCLUDING

COUNTRY DWELLINGS, IMPROVING AND PLANTING GROUNDS
FRUITS AND FLOWERS, DOMESTIC ANIMALS,

AND ALL

FARM AND GARDEN PROCESSES.

BY J. J. THOMAS,
AUTHOR OF THE "AMERICAN FRUIT CULTURIST," AND "FARM IMPLEMENTS,"
ASSOCIATE EDITOR OF THE "COUNTRY GENTLEMAN" AND "CULTIVATOR."

VOL. III.
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ALBANY, N. Y.
LUTHER TUCKER & SON, 395 BROADWAY.
1898.

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BY JOHN J. THOMAS.

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In short, no farmer, orchardist, gardener, breeder, dairyman, or cultivator of a country place of any sort, is keeping up with the procession, or really knows what is going on, unless he reads it regularly.

Of course it costs more than other agricultural papers—that is generally the case with the *best* of everything, is it not?—but the difference, spread out as it is *over a whole year*, is at most but a trifle hardly worth talking about, and it may be reduced to *less than a cent a week* by joining a club or (better still) getting a few friends to unite in making one up. They need not all be at the same post-office, but may be scattered as much as necessary.

LUTHER TUCKER & SON, Publishers, Albany, N. Y.

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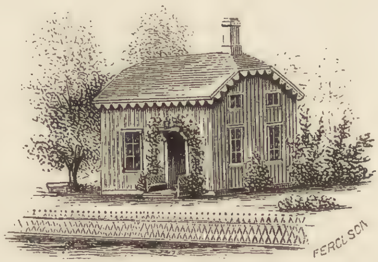


WORKINGMEN'S COTTAGES.

THE INQUIRY has been often anxiously made, why so many of our young men leave the farm for other pursuits, and why farmers' daughters so frequently prefer to marry men of other professions. There is no question that the want of domestic seclusion and comfort, occasioned by the apparent necessity of boarding hired men, renders the farmer's home unnecessarily repulsive to young people. Girls, especially, must regard with no little dread, a prospective life of drudgery in providing three meals a day for ten or twenty hungry, hard-working, dusty men, and in furnishing room for them for all days of the week. They know very well from observation that the wives of mechanics and shopkeepers often preserve the bloom and elasticity of youth, long after farmers' wives of the same age have become pale, wrinkled and bent, under the accumulated labors of kitchen life.

We have repeatedly urged on former occasions, the true remedy, as we regard it, for these very serious evils—namely, the Erection of Cottages, for the occupancy of the workmen who do the labors of the farm. Having actually tried the experiment for twenty years, we earnestly commend it to others; and we are sure that if farmers' daughters, before they give an affirmative answer to the young men who apply for their heart and hand, would require the erection of such cottages as a condition of matrimonial engagement, a reformation would rapidly take place.

There are many advantages in hiring men with families. They are generally

more steady, reliable and uniform. They will usually take a portion of their wages in provisions for their family supplies. Their wives, having comparatively little to do, can provide their meals at less cost than the same can be done by the hired "help" of the farmer, and consequently such laborers generally charge but little more for their own board than the actual cost of the provisions.

Laborers' cottages differ essentially in some respects from larger dwellings. A leading object is to have them small, compact and cheap. The farmer who erects several, must study economy in construction. The rooms must be few, and no space allowed for waste or ornament. In sheltered positions they need not have a front entry. They should, like all other houses, have a door in the rear; and the common use of this obviates the necessity of using often the front door, especially in winter. All should have a cellar, where the ground will admit it, not only for the economy of keeping roots, provisions, &c., but because a cellar is the cheapest apartment, costing only the digging and stone wall. They should all have room enough above stairs for sleeping apartments, and for this reason the height above the second floor to the eaves should be three or four feet. The roof being rather steep, will give more space, and be less liable to leakage.

The bed-room should not open into the entry where there happens to be any, but into the living-room, that it may become readily warmed in winter.

DESIGN I.

This Design is for a cottage of the smallest size, built where a cellar cannot be excavated, or where it would not be an object sought. The deficiency is in part supplied by a spacious pantry. A perspective view is given on the previous page, forming the vignette of this article. The plan (fig. 2,) nearly explains itself. A good closet, opening into the bed-room, is made under the stairs. Two rooms may be made above stairs, by running a board partition across the middle, and passing through one to enter the other.

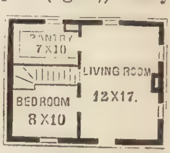


Fig. 2—Plan.

This cottage is covered with vertical plank, matched and battened, and lathed within on corresponding battens. The only timbers are the sills and plates. In exposed situations, where more stability would be required to resist the force of wind, pieces of plank about two by three or two by four inches should be made to constitute the inner battens. This is effected by erecting these first, or before the siding is nailed on, by setting them up perpendicularly on the top of the sill, nailing them to the sill, and fastening them at the top by laying an inch board flat upon their upper ends, and nailing every one to its place through this board. The joists for both floors are simply nailed to these vertical plank, the lower joists resting on the sills, and the upper resting on a board extending around inside and let into these plank. This will make a solid and strong frame with little material and a small amount of labor.

If planed and painted, this cottage, which is only 18 by 23 feet, would cost about two hundred and fifty dollars; if made of rough boards outside and whitewashed, about two hundred dollars—varying, however, more or less, according to the price of lumber, labor, and other causes.

DESIGN II.

This is a small but complete cottage of its kind, (fig. 3.) It has a front entry as a protection from cold winds, and for proper seclusion; a small closet on the left of this entry; a bed-room and living-room, the latter with two closets; and a wood-house in the rear, which may be built with the house or added afterwards. A portion of this wood-house may

Fig. 3—Perspective View.

Fig. 4—Plan.

be fitted up as a sort of summer kitchen, to which the cooking stove may be removed during dog-days. The cellar beneath is reached by a flight of stairs from the living-room, under the entry stairs. The bed-room on the principal floor may open into the entry, if desired; but it will be more comfortable in cold weather if immediately connected with the living-room and receiving of its warmth. The stairs to the chamber, land under the highest part of the roof, consequently there is no danger of striking one's head against the rafters. There are two rooms and a spacious closet above.

There being no windows on the side of the entrance, it is intended that this side be mostly covered with prairie roses or other running plants, kept several inches or a foot from the outside boards by means of a frame or lattice-work trellis, made for their support.

This cottage is nearly square, or 18 by 20 feet outside, affording an economical enclosure of space; and the roof having considerable ascent, furnishes plenty of chamber room. The ceiling is $7\frac{1}{2}$ feet high, and the eaves about 3 feet above it. It may be built with a cellar under the whole, and with a rough board wood-house, for about three hundred dollars.

It should be observed that the window-hoods for this and the other cottages, should not be made of inch boards as is sometimes done, which gives them a flimsy appearance, but of plank at least two inches thick, and better if three inches.

DESIGN III.

This is intended as one of the better class of workingmen's cottages, or for a small and cheap farm-house, (fig. 5.) It is well adapted for a young farmer beginning business, and is especially intended for future enlargement, as may be necessary.

There are three rooms on the principal floor (fig. 6)—the larger one to answer the general purposes of living-room or kitchen, dining-room and parlor. Of the two bed-rooms adjoining, the front one is intended to be neatly fitted up with carpet and a few chairs, for the mistress and one or two of her female friends to occupy when on a visit, if desired.

Fig. 5—Perspective View.

The stairs being placed under the eaves or lower part of the chamber, (fig. 7,) do not encroach upon the space above needed for rooms—and a dormer window being placed in the rear, over the landing, serves to light the upper entry, and to allow room for the head on ascending. There are three good bedrooms above stairs, each amply supplied with closet room. If desired, a small closet at the head of the stairs, accessible from the entry, may be taken from the closet in the smaller room.

No front entry is provided for this house. If the situation is a sheltered one, it will scarcely be needed with the cover afforded by the broad hood over the door; but if it should become necessary at any future time as the house may be enlarged, it may be obtained by adding a box portico in front.

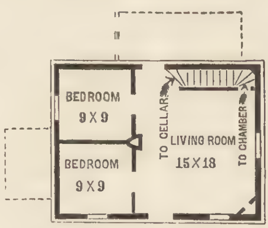


Fig. 6—Principal Floor.

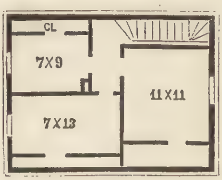


Fig. 7—Chamber.

This house may be enlarged by adding a wood-house in the rear, as indicated by the dotted lines, or both wood-house and kitchen; at the same time running the stair-case partition across as far as the rear bed-room, and inserting a door, so as to make a rear entry between the new kitchen and the living-room, from which there is access to the cellar. Another bed-room may be added on the left end of the house, at the dot-

ted lines, and the present front bed-room converted into a library, office or study room.

The cost of this house, built of wood, the lower rooms eight feet high, the upper four feet at the eaves, and with a good cellar, would vary from five to six hundred and fifty dollars; and the additions of new kitchen, bed-room and wood-house, would be about two hundred and fifty or three hundred more.

DESIGN IV.

A Design is here presented of one of the larger and more complete workingmen's cottages, or which may be built as a cheap farm-house for a small family, where some taste of exterior is an object. (fig. 8.) The points in

Fig. 8—Perspective View.

which it excels some of the larger plans already given, are, the entries for both front and rear door, a wing furnishing pantry and wood-house, and a portico, which is surmounted with a small balcony, entered from the upper passage through the glass door. There is also a large amount of closet room up stairs, in which may be neatly packed away much of the material that is commonly thrown promiscuously

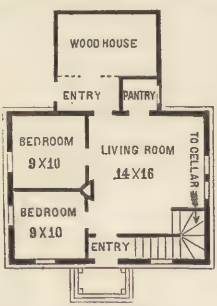


Fig. 9—Principal Floor.

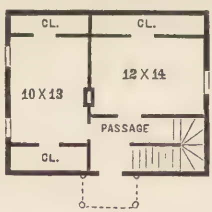


Fig. 10—Chamber.

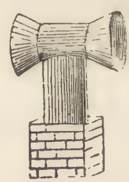


Fig. 11—Chimney.

in garrets; while the rougher articles of this class may go to the wood-house chamber. By making the wood-house a little longer, a greater length may

be given to the pantry, and the back entry may then be made large enough to receive the cooking stove in the heat of mid-summer, the smoke being carried up into a brick chimney built for this purpose. This chimney need be carried up to but a moderate height above the roof if surmounted with the cap represented by fig. 11.

This design is remarkable for its compactness of arrangement. The front entry is smaller than would be practicable, but for the room given in the stairway. The lower portion of the stairs being under the lowest part of the roof, do not occupy valuable chamber room. The same economy of space is observed in the places assigned to the upper closets. The single chimney may be made to warm every room. The front bed-room may be made, if desired, to open into the front entry, instead of into the living-room. It will be an advantage which many would deem valuable, that the two rooms above mentioned, may open either into the living-room or out of doors, by the front and rear entry.

The cost of this house well built of wood, with a cellar under the whole, would be six or seven hundred dollars—but by finer material, slight enlargement of the rooms, and better finish, it would cost a thousand.

DESIGN V.

The accompanying Design of a neat and ornamental laborer's cottage, was furnished by Lawrence B. Valk, architect, New-York. The views and plans supply of themselves all the necessary information in relation to it,

Fig. 12—Perspective View.

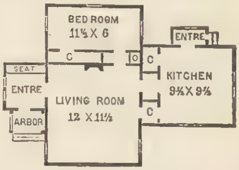


Fig. 13—Plan.

being but one story. He assures us it was actually erected for three hundred and sixty dollars for the owner in New-York.

DESIGN VI.

A correspondent* has forwarded a plan for a workingman's cottage or cheap house, (fig. 14,) which he thinks a "fair" one for the size and amount of room given. This plan is given in fig. 15 for the purpose of showing how easily several important improvements may often be made in such plans. Fig. 16 represents the same as improved by a single alteration, without adding to the cost, but securing several advantages. The alteration consists merely

* J. M. Wade, of Rhode Island.

Fig. 14—Perspective View.

in removing the stairs from the corner to a more central part of the house, as will be perceived by comparing the two plans. In the original design, the stairs must be necessarily very steep, from the short space they occupy—only eight feet in length in the sketch furnished by our correspondent; while in the improved design they may be ten feet long without crowding. The improvement accomplishes the following advantages:

1. In ascending to the chamber, there is no danger of striking the head against the low roof of the story-and-half house near the eaves, the landing being under the highest part.

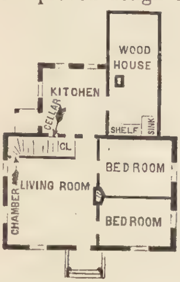


Fig. 15—Original Plan.

Fig. 16—Plan as Improved.

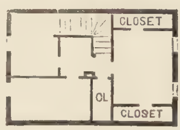


Fig. 17—Chamber.

2. By landing near the middle of the chamber, a small entry is easily made from which every room is entered, without passing through another. A closet is also furnished at the head of the stairs for bedding, &c.

3. The entrance below is also nearer the middle of the cellar, and not at one remote corner.

4. The closet or pantry between the kitchen and dining-room is larger, and is more convenient.

5. The entrance to the stairs is more convenient, especially from the kitchen, as it is not necessary to pass through the living-room for this purpose.

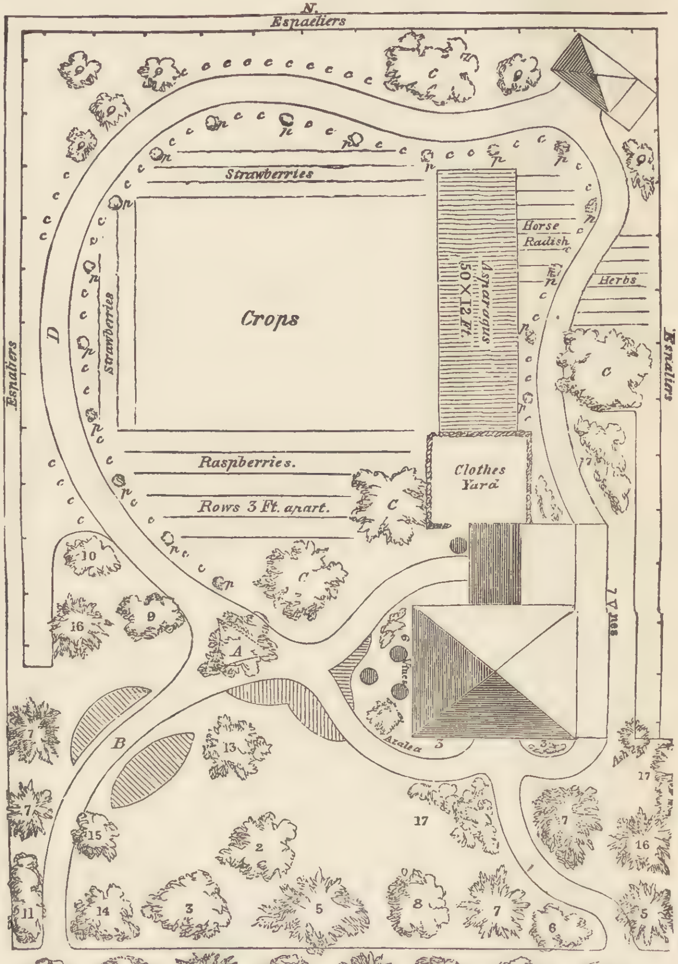


Fig. 1—VILLAGE GARDEN OF ABOUT HALF AN ACRE.

LAYING OUT GROUNDS.

The many different sizes, forms, and other circumstances, of the Grounds which surround dwellings, render a large number of plans desirable for those who would obtain suggestions, and adopt such as are best suited to their own places. Hence we deem it important to continue to give such plans, and with this view present a few to the readers of the Register on the present occasion.

The first (on opposite page,) is one copied from *Copeland's Country Life*,* a work abounding in fine illustrations on Horticulture and Landscape Gardening, and containing valuable matter on these subjects. It represents a village garden of about half an acre, and is adapted to either a laborer's cottage or to a more costly residence. The work being all performed by hand, every advantage is taken by extending the walk around the whole grounds, to give it variety and extent in appearance.

The lot is supposed to be 125 by 175 feet, or about 7½ by 10½ rods. The house may be about 25 by 35 feet—the walks 6 to 8 feet wide. The reader will observe that the too common and very stiff mode, of laying a straight walk at right angles to the road and dwelling, is entirely avoided, and graceful curves introduced, giving more seclusion, and apparent breadth to the front grounds. The house is placed towards one side, to prevent cutting up and abridging the plan.

This design will not need a minute explanation. The trees next the street are of different sorts, to relieve the stiffness which would result from a row of one kind. The rear walk passes around the whole of the kitchen garden, which is partly hid by the dwarf fruit trees which line the walk. The building in the rear may be a hen and pig house. For further details for the management and keeping of the grounds, the reader is referred to the article "Ornamental Planting," in the last number of the Register.

A western correspondent furnishes the following plan of a residence and its surrounding grounds, (fig. 2, on next page,) which, on being laid out and planted, are found too stiff to prove satisfactory, and requests a better plan. The country around the house is rolling prairie. The house is situated on an eminence commanding a view of the town a mile distant, towards *a*. The scenery is quite similar in all directions. The trees shown in this plan are mostly newly planted and may be removed.

In designing a plan, there are many circumstances to be taken into consideration, all more or less modifying the result. The undulations of the surface must be known in order to fix properly the position of the roads and walks. The amount of labor to be expended in keeping the grounds in order,

* Published by J. P. Jewett & Co., Boston.

is another important consideration. If broad spreading trees only are to occupy the lawn, and the grass is to be kept short by sheep, the expense will not be a hundredth part of the amount required to mow the lawn weekly, so as to keep it like velvet, to dress off the walks with mathematical precision, and to keep trees, shrubs, and brilliant flower beds in the turf, in the highest state of culture and finish. It is not supposed that any one asking us for information on this subject, would adopt the slovenly mode of allowing the grass to grow up for hay, to be cut but once a year, on a space like this of but two or three acres.

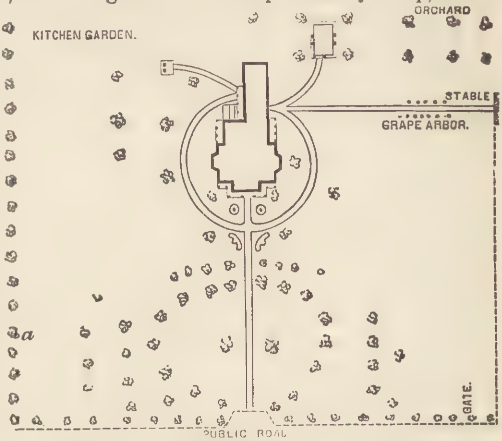


Fig. 2—Stiff and Unimproved Plan of Grounds.

The middle course is doubtless intended—to plant only the more thrifty growing trees, and hardy and vigorous shrubs near the dwelling, and to keep the grass mowed frequently—say once a week in early summer, and once in two or three weeks later in the season.

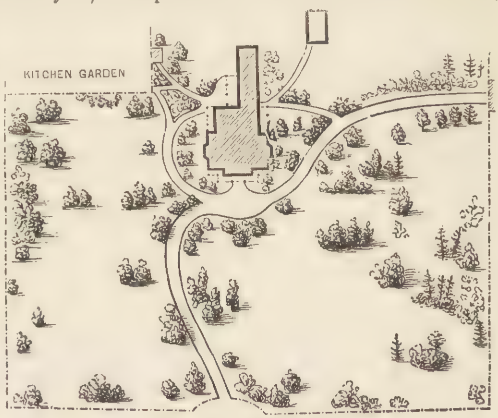


Fig. 3—The Same Improved.

Fig. 3 exhibits the plan proposed as an improvement. We have made it as simple as practicable—laying down but a single carriage road, and a few short walks. A more elaborate plan, and of more costly execution, would have included various walks over the

lawn, now intended to be merely traversed in the short grass. Most of the walks in immediate proximity to the house, are such as utility demands, and they are skirted with the smaller shrubbery; or, if desired, with circular or oval flower beds. But the latter must be kept in the neatest trim, and occupied with continued bloomers, or they will appear worse than none. The grape arbor on the road to the stable is omitted, as being unsuited at that place, where the vines could not be properly cultivated for successful growth.

In a minute working plan, the position of every tree and its kind, would be given. This reduced figure precludes such minuteness of detail—the engraving will show the style of planting; selecting the trees and adjusting their position, will afford an endless exercise of taste and skill. Some hints w˙l be found in the REGISTER for 1860, pages 250, 251, &c. The mode of transferring the plan from paper to the ground, is given on page 245 of the same work.

Laying out a Western Farm.

A Kansas correspondent sends the accompanying plan (fig. 4) of his farm as now existing, with a request for a plan for lane, fields, &c., admitting a good rotation. It contains 160 acres—all slopes towards the ravine. A side-hill barn is proposed. The ravine has a running stream, and cannot be plowed. It is flanked with a young growth of timber, intended to preserve. A timber field is desired at the fork.

In figure 5 we have the same farm laid out in fields. The garden lies above and to the right of the house—if the land and view are suitable, it is

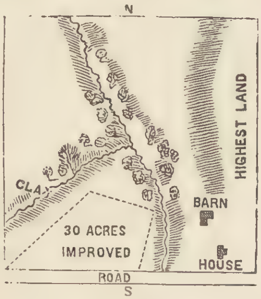


Fig. 4.

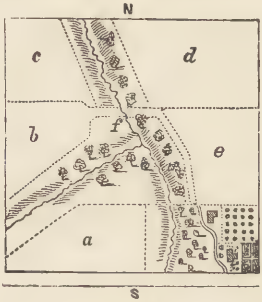


Fig. 5.

proposed to plant shade trees, &c., on the slope below, which may also be used as a horse and sheep pasture. The orchard is above the barn. The field marked *a* is entered from the public road—all the others through the lane, as represented. At *f* there is a bridge—*b* and *c* may be as one field if desired. Less land may be left along the ravine, if suitable. The fences between *c* and *d*, and between *a* and *b*, may be built only on one side of the ravine, if cattle could be excluded from the timber land. The nearer part

of field *e* might be divided off for a calf or hog pasture, if desired, by a fence running east and west. The entrance road to the house may also pass around it to the right, as convenience may require.

It will be observed that the lane or farm road is kept nearly on a level, a most important requisite, although the fields, *d* and *e*, entered from it, lie on the high ridge.

PRUNING AND TRAINING ROSES.

THE ROSE, to continue in successful bloom year after year, must be kept pruned, and be manured and cultivated. Without this care, the bushes will become feeble, stunted, and enveloped in thick and half-dead brush, and the flowers will be few and imperfect. With proper management, on the contrary, the plants may be kept healthy, vigorous, and afford yearly a profusion of fully developed and beautiful flowers.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

It is hard to persuade a novice, on setting out a young rose bush, to use his knife at all. He "cannot bear" to cut off those long promising shoots. The consequence is, his bushes barely survive the first season, and make little

Fig. 5.

Fig. 6.

or no growth. Had he cut back freely, he would have had perhaps five times the amount of stem and shoots by autumn, and that of a most vigorous character. These remarks apply especially to the free growers, as for example, the stronger summer and the prairie varieties.

The simplest mode of training is in the form of a *bush*, as shown in fig. 1. For the management of such, the chief requisites are the yearly application of old manure, cutting out old wood, and leaving but few of the new and best shoots. If too many are left, the leaves will be crowded and small, and the flowers less perfectly formed.

Fig. 7.

Tree Roses are greatly admired when well trained, but they require much care. Specimens are shown in figs. 2 and 3. They are usually made by budding on vigorous standards about two feet high. The buds, when growing, form the head. Two modes are pursued; one, to form the head from a single bud, as shown by fig. 4; and the other by the growth of two or three buds, as in fig. 5. Both modes

have their advocates and advantages, but success depends more on general treatment.

Fig. 5 (on the preceding page,) exhibits the appearance of a tree rose-bush, (divested of its foliage,) after one year's growth of the three buds. The places for cutting back these new shoots are indicated by the letters *a* and *b*.

Fig. 8.

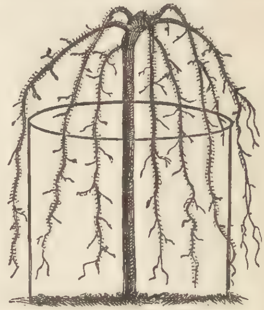


Fig. 9.

Six or seven shoots are a sufficient number to be left, of those which will be thrown out the second year—one, the leader, should be upright, the rest around it, and the lower down the longer they should be, so as to give the head the form of half a sphere with the flat part downwards, or rather the form of the large part of a sphere unequally cut. As much as practicable, the shoots should be made to grow from the center outwards, so that they may not cross each other and form a confused and crowded head. Fig. 6 represents the tree fully formed after some years growth.

Fig. 10.

Fig. 11.

Weeping roses (fig. 7 on preceding page,) are produced by budding the longer and freer growing sorts standard height, as in fig. 8, and afterwards bending them downwards and giving them a uniformly drooping form by means of a hoop, (figure 9.) It is especially important to keep weeping roses well and

uniformly pruned. The Prairie roses may be made into handsome weeping bushes.

A mode of forming *Pillar roses* is described and illustrated on page 27 of the second volume of Rural Affairs. Another is represented by fig. 10, the support consisting of the trunk of a small tree of cedar or other durable wood, the branches being cut within eight or ten inches of the stem. Strong growing shoots are formed by first giving a strong root to the rose by means of a rich soil and good culture, and then cutting back freely. The taller and more rapid growing summer roses will do for pillars, but the Prairie roses are best. Nothing can be finer than the effect produced by the blooming of a plant each of the Queen of the Prairies and Baltimore Belle, both trained together on one pillar. Fig. 11 is part of a rose pillar with the growth complete and in full bloom.*

A BASKET OF PLUMS.

For some years past the dwarf plum orchard of Ellwanger & Barry of Rochester, has excited the admiration of all who have visited their nursery at the time of ripening. The high culture, skillful pruning, and assiduous labor in destroying the curculio, bestowed on these trees, have given results

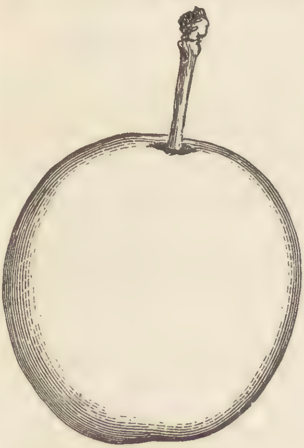


Fig. 1—Nelson's Victory.

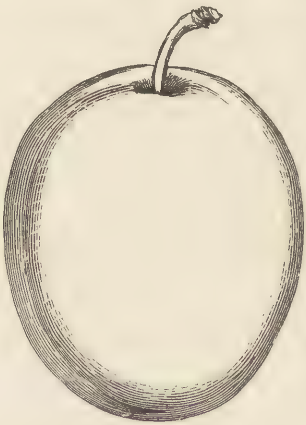


Fig. 2—Sharp's Emperor.

which we have never seen excelled and rarely equalled. Those magnificent varieties, the Bradshaw, Pond's Seedling. Victoria, Sharp's Emperor, and

* The cuts which illustrate this article are from Copeland's "Country Life," to the publishers of which we are indebted for them.

Goliath, loading the bending branches which sustain them, are a sight to view! At a recent visit, they presented us with a basket of several specimens each, of a large number of sorts; and as many of them are comparatively new, we believe it will be an acceptable service to our pomological readers to give figures and descriptions of some of the most valuable and interesting varieties.

NELSON'S VICTORY, (fig. 1.)—Medium in size, roundish oval, brownish yellow, with some dull red, stone small, free, juicy, good. Its origin is English; the growth is vigorous, and it is exceedingly productive, which, added to its beautiful appearance, will make it fine for market.

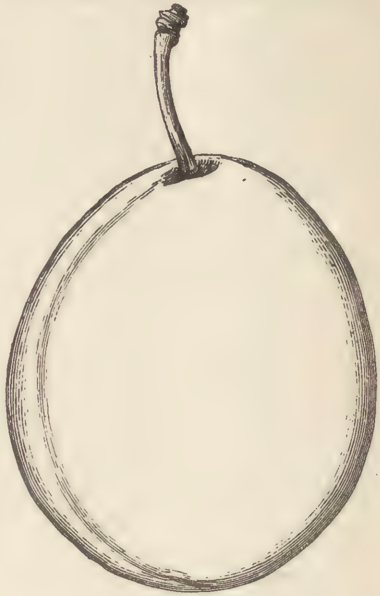


Fig. 3—BRADSHAW.

Fig. 4—WANGENHEIM.

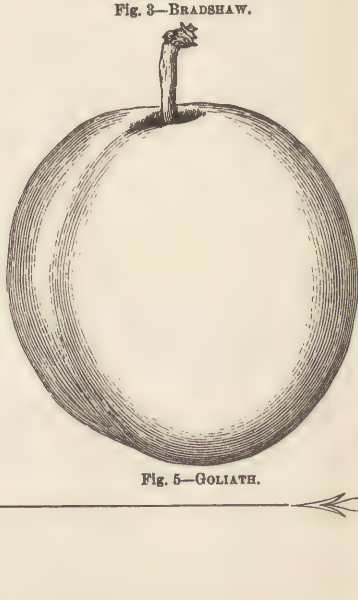


Fig. 5—GOLIATH.

SHARP'S EMPEROR, (fig. 2.)—One of the best market sorts, large, handsome, very showy, resembling Victoria, but the tree is more regular, not so vigorous, and the shoots less downy.

BRADSHAW, (fig. 3.)—This is a plum of foreign origin, remarkable for its large size, productiveness, and vigorous growth of the tree—qualities rendering it eminently valuable as a market variety. It was described by P. Barry in the Horticulturist for 1855.

It is of largest size, a large portion of the specimens on thrifty trees measuring two and a-quarter inches long, and an inch and seven-eighths cross diameter. It is oval in form, inclining to obovate, sometimes with a very slight neck; suture obtuse; color, dark purple, with a light blue bloom; stalk three-fourths to one inch long, set in a narrow cavity; flesh a little coarse, becoming light brownish purple, at first adhering, but nearly free from the stone when fully ripe; juicy, good, slightly acid; tree erect in growth, vigorous; shoots purple, smooth. Ripens the last of summer.

WANGENHEIM, (fig. 4.)—Medium in size, oval, suture shallow but distinct, color dark blue, stem rather short, set without depression; flesh greenish

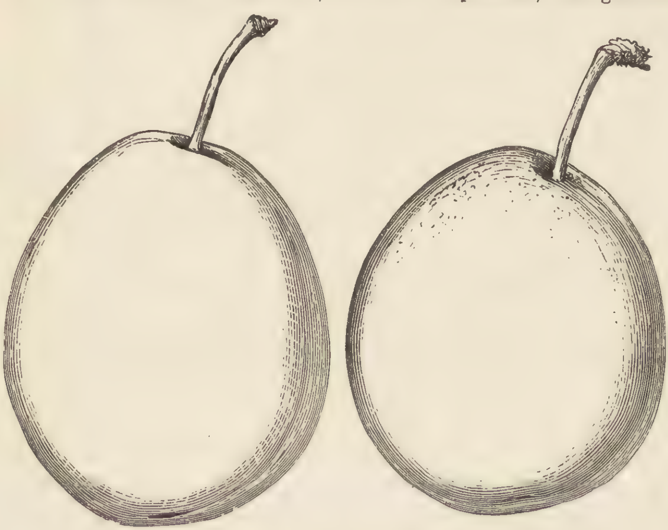


Fig. 6—VICTORIA. Fig. 7—PETERS' YELLOW GAGE.

yellow, juicy, firm, sweet, rich, "very good," partly free from the rather large stone. This is of German origin, and is a sort of prune; the growth is erect, moderately vigorous, and the tree very productive—it is one of the best of its class.

Goliath, (fig. 5.)—Large and handsome, roundish oval or roundish oblong, usually larger on one side of the suture, color deep red or greenish yellow, dark purple in the sun and somewhat mottled; stalk in a very deep and narrow cavity; flesh light brownish yellow, adhering somewhat to the stone, juicy, rather coarse or fibrous, with a brisk, sprightly flavor—"good." English—a strong grower and very productive, and bears young—profitable.

Victoria, (fig. 6.)—Large, obovate, suture distinct, stem half an inch long, in a rather deep and narrow cavity; color a fine light reddish purple; flesh yellow, pleasant, "good," adhering to the stone. It has been long known in some parts of England—stands next to Pond's Seedling in size and beauty, and in productiveness, and is a great grower, rather irregular. It is distinct from and better than Sharp's Emperor.

Peters' Yellow Gage, (fig. 7.)—Large, nearly oval, somewhat varying or irregular in form, stem three-fourths of an inch long, set in a rather deep

Fig. 8—Lucombe's Nonsuch.

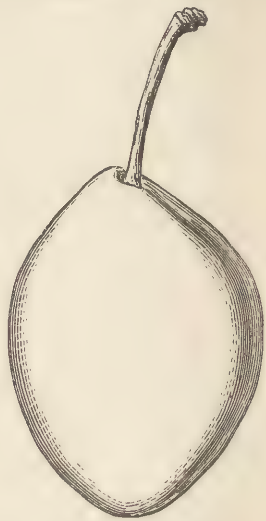


Fig. 9—Fellenberg.

cavity, which is a little on one side of the plum; suture distinct, dividing the fruit in slightly unequal portions; color a rich greenish yellow, with some crimson dots towards the sun; flesh greenish yellow, rich, sweet, "very good."

Lucombe's Nonsuch, (fig. 8.)—Large, nearly globular, suture distinct, color greenish yellow, marbled, or with broad attenuating stripes of yellowish orange and greenish yellow; stalks three-fourths of an inch long, in a considerable cavity; flesh moderately firm, greenish yellow, sweet when full

ripe, juicy, "good or very good;" adheres to the stone. Shoots smooth. Compares favorably in quality with Imperial Gage. Tree a vigorous grower.

Fellenberg, *or Italian Prune*, (fig. 9.)—Size medium, oval, rather pointed at the ends, suture small but distinct; color dark purple with a light blue bloom; stalk an inch long, scarcely sunk at the insertion; flesh greenish yellow, juicy, sweet, "good," approaching "very good," free from stone.

Pond's Seedling, *of the English*, (fig. 10.)—Fruit of the largest size,

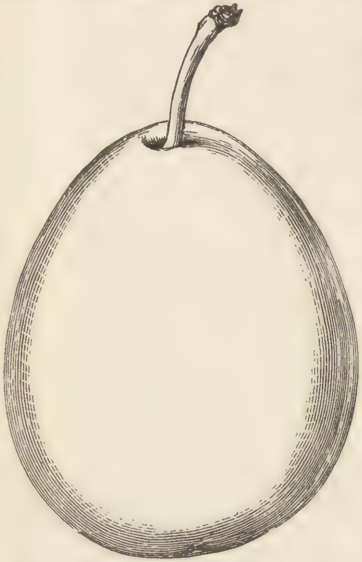


Fig. 10—Pond's Seedling.

Fig. 11—Purple Gage.

exceedingly showy, often two and a-quarter inches long and an inch and seven-eighths in diameter, obovate and suture small, distinct on one side, obscure on the other, accompanied on both sides by an obscure ridge; stem three-fourths of an inch long, in a small cavity; color light red, flesh yellowish, somewhat fibrous, adhering firmly to the stone, sub-acid, of moderate flavor, "good." Shoots smooth—ripens middle or latter part of 9 mo. (Sept.) The most showy and brilliant of all plums—great grower and bearer—quality about equal to Yellow Egg.

Purple Gage, (fig. 11.)—This excellent plum, under whose name a spurious sort has often been disseminated, is of full medium size, roundish, color a dull rich purple, with russet dots and nettings; stalk an inch long, cavity slight, flesh greenish yellow, fine grained, juicy, sweet, "very good," if not "best," possessing much of the excellence of the Green Gage.

NECTARINE, (fig. 12.)—Fruit large, nearly round, sometimes slightly approaching oblong or ovate, suture moderate; stem quite short, in a deep wide

Fig. 12—NECTARINE.

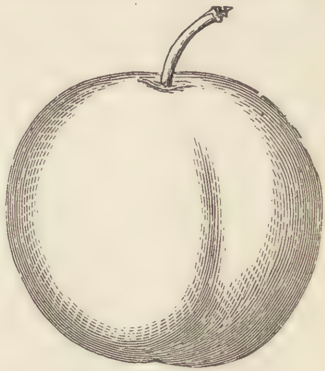


Fig. 13—ROYAL TOURS.

cavity; skin dull rich purple, with conspicuous russet specks; flesh dull brownish yellow, somewhat fibrous, juicy, with a sprightly moderate, somewhat acid flavor—"good"—adheres partially to the stone.

ROYAL TOURS, (fig. 13.)—Large, (an inch and a-half in diameter,) nearly globular, a distinct but

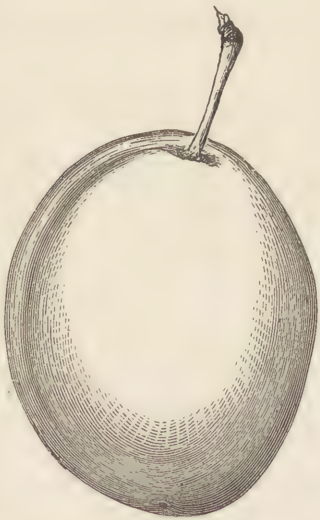


Fig. 14—PRINCE ENGLEBERT.

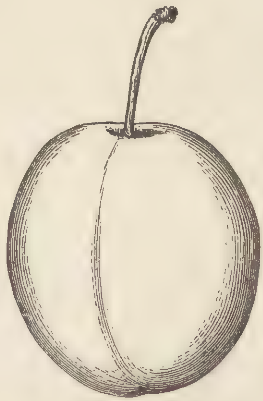


Fig. 15—PRINCE'S YELLOW GAGE.

shallow suture extending half around, the whole surface plump and obtuse; skin reddish purple in the shade, but very dark purple in the sun, with a conspicuous blue bloom; stalk half an inch long, set in a small and shallow cavity; flesh light brown when fully ripe, juicy, quite high flavored, at least "very good," according to the pomological scale—nearly free from the oval, flat stone. An excellent plum.

PRINCE ENGLEBERT, (fig. 14.)—This plum is a Belgian variety. The fruit is quite large, oblong-oval, deep blueish purple, with a dense bloom; the stem is rather slender, set in a distinct ring at base, and in a rather deep narrow cavity; suture distinct; flesh very juicy and melting, with a pleasant, moderately rich and excellent flavor, parting from the stone. The tree is said to be a free grower, and to prove very productive. It ripens the latter part of 8 mo. (Aug.) The shoots are downy.

PRINCE'S YELLOW GAGE, (fig. 15.)—Well known and an excellent variety.

NOTES ON STRAWBERRIES.

EVERY year developes the character of some new variety of the Strawberry, or reverses or establishes opinions in relation to older sorts. The following remarks indicate nearly the results of the experiments of many cultivators up to the present time.

Most of these results confirm the excellence and value of the *Triomphe de Gand*, (fig. 1,) which of late years has been acquiring a high reputation for fine quality, hardiness, productiveness and great size. It is a staminate—resembles Wilson's Albany in the dark green color of its leaves, and is a strong grower. The writer has measured berries, two inches through the longest diameter.

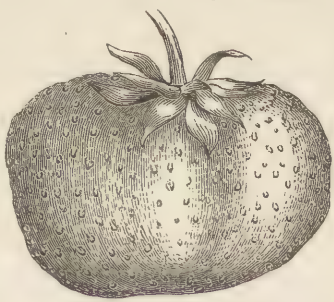


Fig. 1—TRIOMPHE DE GAND.

Burr's New Pine, now become an old variety, still maintains its character for excellence, but the berry is too soft and delicate for market, and the plants are rather feeble growers. As it is a pistillate and requires a fertilizer, it is less valued by many on this account.

Brighton Pine, (from Brighton, Mass.,) proves to be a fine reliable sort, but could not be classed among the very best.

Hooker, although an admirable berry—large, excellent and productive—is too liable to winter-killing for extensive cultivation. It is true it often

escapes disaster, but frequently patches or portions of plantations are destroyed. Many will, however, retain it to a limited extent on account of its high quality. In sheltered positions it may not suffer.

Iowa, (*Washington* of Cincinnati market,) although of second quality in flavor, is regarded by many intelligent cultivators as possessing some very valuable qualities for market culture, more especially for its hardiness, productiveness, and perfect fruit. Its dense trusses of berries always present a fine appearance.

Jenny Lind sustains its character as a good, very early sort—usually quite as early as the Scarlet—larger, and equal to it in quality. A staminate.

Moyamensing, (large, dark crimson,) holds a respectable rank, but not among the first. It is a valuable sort, but is hardly worthy of extensive recommendation.

Prince's Magnate has been fully tried by H. E. Hooker and others at Rochester, but although a fine berry, the plant is of quite feeble growth, and it cannot be strongly recommended.

Trollope's Victoria (fig. 2,) is a very large, fine variety—sometimes considerably productive, but oftener rather sparingly so. Still, it will be cultivated to some extent on account of its size, showy appearance and fine flavor. Like the Triomphe de Gand, it appears to be quite hardy.

Fig. 2—Trollope's Victoria.

Fig. 3—Scott's Seedling.

Scott's Seedling, (fig. 3.) Raised by J. Scott of Brighton, Mass. Large and showy in appearance, but of moderate quality. It is worthy a place in large collections, and is especially valuable for its showy appearance and great productiveness. A staminate—and a good market sort.

For profuse bearing and extreme hardiness, nothing has yet been found equal to *Wilson's Albany*—these qualities will overbalance the second-rate flavor, and it will doubtless long continue a general favorite. But few

cultivators will observe the material difference in quality between this and the more delicious sorts.

Crimson Cone, (pistillate,) although rather small, is still highly esteemed by some on account of its lateness, good quality, hardiness and productiveness. Its firm flesh and brilliant color give it advantages as a market variety.

PRUNING DWARF PEARS.

It is well known to every intelligent fruit culturist, that there have been many failures with Dwarf Pears. With the bad manner in which they have been managed, it is surprising that there should not have been more. Other kinds of trees, as the apple, peach, and cherry, have been generally treated with utter neglect, and yet some of them have survived and given tolerable returns. Presuming on this success, most planters are determined to compel dwarf pears to submit to the same treatment. The result has been the exclamation, "Dwarf pears are a humbug!"

There is no farm crop cultivated by man, that could endure such a course. What would be thought of the farmer who would plant corn in an unplowed meadow, potatoes in a pasture, and allow carrots to become overtopped with a growth of two feet of pig-weeds and thistles, and after the failure that would inevitably result, gravely declare, "Corn, and potatoes, and carrots, are sheer humbugs."

Cultivation is quite as essential to the growth of the dwarf pear as to farm crops, and other requisites must be super-added. The stocks must be good and vigorous, and not like many formerly used. The varieties of the pear must be selected among those which grow vigorously on quince, which probably do not constitute a twentieth part of the whole number of sorts. Many fail because they are comparatively unfitted to dwarf growth. Failure sometimes results from a cold, thin, or wet soil, and more frequently from a want of manuring and sufficient cultivation. And lastly, a neglect of *thorough pruning* has been a fruitful cause of failure. The former requisites have been already treated of in former numbers of the REGISTER; the latter may deserve fome further attention.

T. G. YEOMANS of Walworth, Wayne Co., N. Y., one of our most successful cultivators of the dwarf pear, who has received in cash from a single crop of the fruit, over $500 from one-third of an acre, or at the rate of $1500 per acre—and frequently nearly as much as this, gives the following excellent practical directions for the pruning of the trees:

"Experience has convinced me, that with good trees, of well chosen varieties, on any good corn land, which is never too wet; and with the culture a good farmer gives his other crops, and the important—nay more, the indis-

pensable requisite to success—*thorough pruning*, no one need fail of attaining a degree of success highly satisfactory and profitable.

A dwarf pear tree should never be planted at one year old. A good one-year-old tree consists of a single upright shoot or stem, from three and one-half to five feet high, and should be cut off at about two feet from the ground; and in order to give a smooth, handsome stem or trunk, let the buds be rubbed off, to the height of one foot from the ground—leaving on the upper portion six to nine buds, more or less; with the tree standing in its original position in full vigor, and cut back as above stated, each one of these buds will throw out a good strong branch, which gives a full round distaff form to the tree; and is the time and manner, and the only time, when that desirable shape can be given, on which the future form of symmetry and beauty so much depends; and to avoid what is termed a crotched or fork-topped tree, in which the two uppermost branches are about of equal vigor and height, let the second branch from the top be pinched off, when about nine inches or a foot long, which will check and weaken it, while the uppermost one becomes a strong central leader. Whereas, if the tree be transplanted at one year old, and cut back as above stated, the vital forces of the tree will be weakened half or three-fourths by transplanting, and, as the result, only two or three, (more or less,) of the buds on the trunk, will grow so as to form branches, and they perhaps only at the top or all on one side, while the remaining buds remain dormant, never afterwards to be developed, as the other branches form new channels, which will more readily carry the sap to the other and upper portions of the tree.

For transplanting, therefore, let a tree be two years old from the bud, well cut back at one year old, and with six to nine main branches, which form the frame work or foundation, which is to give form and character to the future tree, with proper care and management.

Fig. 1.

The annexed cut (fig. 1,) will illustrate a two-year-old tree, as above described, its lower branches about one foot from the ground, its upper branches being the strongest and most upright, and those below less vigorous and more horizontal.

I speak of this more particularly, for the reason that all the cuts which I have noticed in works on Pomology, and in agricultural papers, represent a two-year-old tree, with branches much the longest and strongest at the bottom, and diminishing in vigor towards the top, except, perhaps, the center top branch; while all experience illustrates the principle that the sap flows most freely and readily

Fig. 2.

to the upper branches, giving them vigor, strength and uprightness, to the diminution of the same characteristics in those below.

The dotted lines indicate where the branches should be cut back at the time of planting.

In cutting a tree, with branches formed as above described, let the leader be cut down within four to six inches of the place where the one-year-old tree was cut off, and just above a good bud on the side of the tree, over the previous year's cut, thus keeping the leader in a perpendicular position over the original trunk or bottom of the tree.

If the side branches are too horizontal, upper buds are left for their extension; if too upright, lower buds are left. Side direction may be given, if desirable, to fill wide spaces, in the same way. Cut the other branches at such a distance from the trunk, that the ends of all of them would form a pyramid, the base of which should not be over twelve to sixteen inches in diameter, and in smallish trees much less; thus the lowest branches will be left the longest; the object of which is to check the natural flow of sap to the upper branches, and induce it to flow more forcibly to the lower ones, increasing the vigor and force of the latter as much as possible, which must be done at that time, or never.

Fig. 2 represents a two-year-old tree after it has been pruned at two years old, and made the third year's growth, and showing where it should be cut back at that time. All subsequent pruning will become easy to any one who has attended to these directions thus far—observing the same principles, thinning out or cutting back any secondary or other branches, as shall seem necessary to admit light and air, or give vigor or symmetry of form to the tree; but as the greatest force of sap will flow to the central and upright branches, they will need to be cut back most, retaining as near as may be the pyramidal form; ever bearing in mind this fact, that no one prunes too much; and, after having pruned well and gathered rich harvests of luscious pears, if you still wish to grow them *larger* and *better* than ever before, prune a little closer, and that result will certainly be attained; and the *vigor*, *beauty* and *longevity* of your trees will be increased thereby."

Fig. 3.

In addition to the figures (1 and 2,) illustrating the mode of pruning, we add an accurate portrait of a dwarf pear, eight years old, and in full bearing, (fig. 3 on preceding page.) It was sketched by the author of the REGISTER, from one in a nearly uniform row of the Louise Bonne of Jersey, growing on the grounds of Ellwanger & Barry of Rochester, and which had produced fine specimens of fruit at the rate of 500 bushels per acre, selling readily on the trees for three dollars per bushel.

STRUCTURES FOR GREEN-HOUSE PLANTS.

THE simplest mode of keeeping green-house plants through winter is in *pits*. It is applicable to such as remain nearly or quite dormant until spring. A cold pit requires no fire, but frequent attention as the weather changes. The simplest kind is represented in the annexed cut, (fig. 1,) showing a section. It is made as follows: Select a sheltered piece of ground; if it has not natural drainage to a depth of three feet, an underdrain must be made. Four feet by eight, or four by twelve, is a convenient size. Dig it three feet deep, insert in it scantling posts, B, B, rising six inches above the surface in front, and eighteen inches above at the rear, which will give the roof a slope. Nail boards, *c*, *c*, to these posts inside, leaving about six inches space between the boards and the earth sides to fill with tan or manure. Above ground, nail boards outside the posts, making a space to be filled with well-rammed tan. The top is to be covered with hot-bed sash, and if double, the pit will be more perfectly secured from frost. The bottom is filled a few inches with small stone, to effect drainage, and with nearly a foot of tan to set the pots in. Coal ashes will answer the purpose of tan. The object is to secure ventilation, dryness, and warmth.

Fig. 1.

After being placed in the pit in autumn, the plants should have as much air as possible, when the weather is not positively freezing, to harden them. When winter is at hand, the outside is lined with tan or leaves, *H*, *H*, secured by means of a second set of posts with boards, *f*, *f*, two feet outside the sash. Additional leaves, *i*, *i*, outside may be applied in severest weather, and a covering of mats and straw, &c., on the double sash, will be essential. If single sash only are used, an earlier and heavier coating of straw will be required.

The chief care needed is to give fresh air whenever the weather is mild,

and to protect from freezing during intense frost. Salvias, Scarlet Geraniums, &c., may be wintered in pits, and being kept quite dormant, grow more vigorously in spring than if kept warm by the fire heat of a green-house. The chief objection is that instead of being an ornament, this pit rather disfigures the grounds.

One of more finished appearance is represented by fig. 2. The lower walls, *b*, *b*, are built with openings, so as to admit warm air from the ferment-

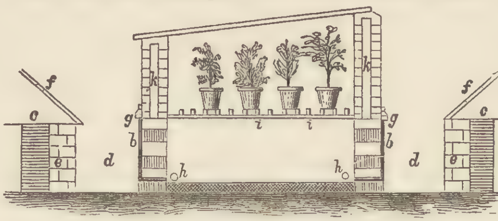


Fig. 2.

ting manure filling the spaces *d*, *d*, and allow it to pass into the apartment occupied with plants. When necessary during very cold weather, additional heat is given through the hot water pipes, *h h*, which may pass from the kitchen boiler, if the pit is near the kitchen. The pots stand on a wooden lattice floor, and the water which falls from the pots is caught by a layer of coal ashes below, which keeps the space dry. The brick walls, *k k*, nine inches thick, are hollow, which makes them better non-conductors than if solid. The doors, *f f*, are made to shut down on the manure in the spaces *d d*. The sash in cold weather is covered with mats and shutters.

For plants, which from their partly dormant or growing condition, require more warmth and air during winter, a green-house or conservatory is requisite. If neatly kept and arranged with taste, it becomes exceedingly interesting and attractive in the depth of winter, (fig. 3.)

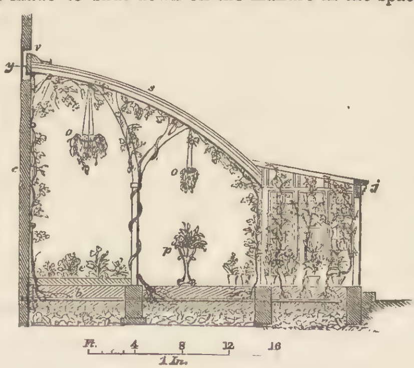


Fig. 3.

A *Conservative Pit*, combining the advantages of a pit and conservatory, is represented in fig. 4 on the next page, copied from *Copeland's Country Life*, to which work we refer for full directions for its construction, and minute details for management. Its floor is about three

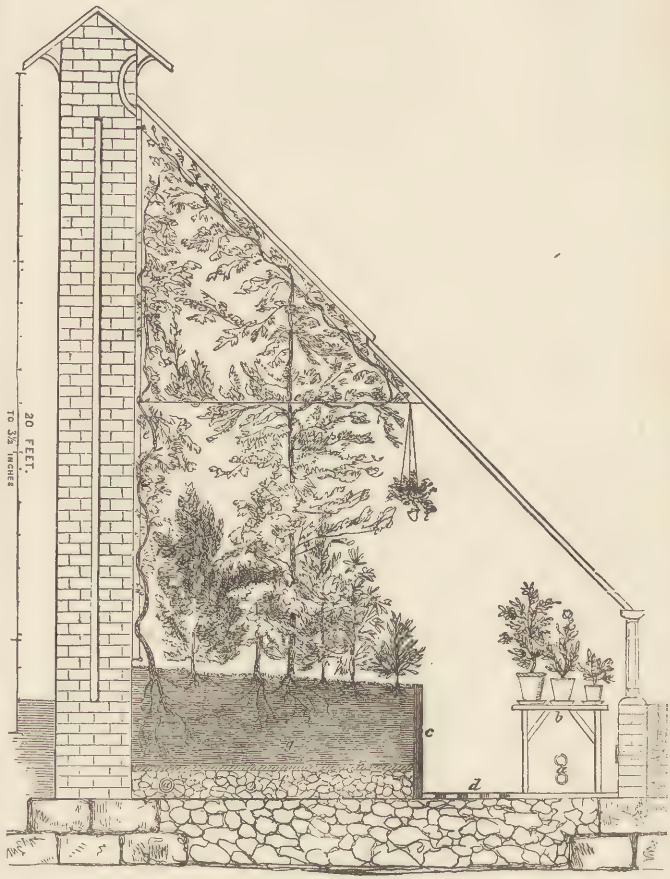


Fig. 4—Conservative Pit.

feet below the surface of the ground, and the whole may be placed on the south side of a dwelling. The pipes for hot water used in heating it, are shown at *a a*; table for pots at *b*; plank for front side of the pit at *c*; floor at *d*; and trellis for the climbers at *e*. There are ventilators at bottom and at top, capable of being shut close or covered with wire-gauze. The cost of such a house, 18 by 30 feet, if of wood, is estimated at $600; of brick, $800.

Ward Cases.

Those who have attempted to cultivate green-house plants in rooms, have met with two serious drawbacks. One is the liability to become coated with dust, and the other is the dryness of the air, which is greatly increased by

Fig. 5.

Fig. 6.

stove heat. For these reasons there are but few plants that will endure for a long time in common living rooms. To obviate these difficulties, the Ward Case has been constructed. It consists essentially in covering the plants with glass. This protects them from dust, and by confining the moisture which is constantly exhaled by the leaves, gives them a humid atmosphere. It also assists materially in equalizing the temperature, and shielding from the effects of the sudden changes which may occur in the room. For these reasons, the care of plants in these cases, is much diminished.

Fig. 5 represents the section of a small and simple case—made by covering a

Fig 7.

Fig. 9.

cast-iron vase of plants with a large bell glass. Fig. 6 is a cast-iron basket of plants, without the glass cover. Fig. 7 is the common Ward Case, attached to a table, and made about three feet long and two feet wide. The glass is nearly two feet high, besides the pyramidal cap.

A simpler and cheaper form of construction is shown in fig. 8, (on next page,) which is made of wood, and covered with window sash. If well constructed and neatly kept, it will have a very ornamental appearance. When

kept in a room subject to occasional cold below freezing, the proper temperature may be maintained by the following contrivance. Let the pots stand on an iron or copper tray, (the pots being supported, if heavy, by iron bars,) beneath which is soldered a convex round piece of sheet copper, so as to form a flat boiler beneath the tray. A tube through the tray above admits filling the boiler and allows the escape of the steam; a small tube and cock below allows the water to be drawn off. A lamp placed under the boiler, heats the water and keeps the plants sufficiently warm.

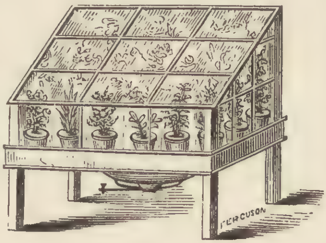


Fig. 8.

WINDOW CASE, (fig. 9.)—This is similar to the Ward Case, but is placed against a window, (a bay window being best,) and thus receives a strong light. It likewise occupies but little space. The shelves may be so made that all the water thrown upon them, and over the plants, by means of a syringe, runs down through the discharge pipe into the pail. A pan made of sheet zinc turned up at the edges, and covering the floor under the case, serves to protect the floor from any drip of water from above.

AQUARIUM, (fig. 10.)—An interesting ornament for a library or cabinet, is a water-tight glass case, supplied with water plants and fish. The water plants alone will not flourish, and the water becomes coated with green slime;

Fig. 10—AQUARIUM.

but the addition of minute shell-fish and other small aquatic animals, renders the water clear, and each causes the other to thrive. Some skill and experience are necessary to adjust the proper number or quantity of each, for their best success

TRANSLUCENT PAINT FOR GLASS.—To give the glass of green-houses, windows, &c., the same character as is possessed by ground glass, grind sugar of lead in oil. Dilute it greatly with spirits of turpentine, and put on with a brush, very thinly, keeping the brush dry or with but little on at a time.

HOW TO OBTAIN FRUIT IN NEW PLACES?

This is an inquiry that often occurs in the minds of many owners of new places, or who have built new houses on unimproved spots. We can inform such residents that much may be done towards an immediate supply, with proper selection and management—and that the assertion which they often hear, that "it will take a life-time to get fruit" from a new plantation, is an absurd error.

The quickest return is from planting *Strawberries.* If set out early in spring, they will bear a moderate crop the same season. We have repeatedly obtained fine ripe berries seven weeks from the day they were set out; and in one instance where transplanted late with a ball of earth to each plant, in less than six weeks. The second year, if the bed is kept clean, the product will be abundant. Wilson's Albany will safely yield any year, a bushel from a square rod, or about two quarts a day for half a month.

Muskmelons and *Watermelons* will yield their delicious products four months after planting.

Gooseberries, *Currants*, *Raspberries*, and *Blackberries*, all bear at about the same period from the time of setting out. Good-sized gooseberry plants, say a foot and a-half high, will give a good crop for bushes of their size, the second year. We have had a bushel of Cherry currants, the third summer after setting out quite small plants, from a row thirty feet long. A bush of Brinckle's Orange raspberry has been known repeatedly to bear about a hundred berries the same year that it was transplanted—the fruit, however, was not full size.

Dwarf Pears of the right sorts, and under right management, come quickly into bearing. If at the common age when set out, or two years from the bud, the most prolific sorts give some returns the second year, and more afterwards. Older trees, if carefully removed, produce larger crops—we have seen a tree of the Louise Bonne of Jersey, six years old when transplanted, bearing a bushel the second summer afterwards; but much care is required for removing such large trees, and they are not subsequently so thrifty as younger ones, and consequently do not yield such excellent fruit. Among the dwarf pears which bear soon, are Louise Bonne of Jersey, Doyenne d'Ete, White Doyenne, Giffard, Fontenay Jalousie, Josephine de Malines, &c. The following sorts bear nearly as early on pear stock, viz: Bartlett, Seckel, Winter Nelis, Washington, Onondaga, Howell, Passe Colmer, Julienne.

Grapes afford fruit soon—usually beginning to bear the second and third year. The Isabella, York Madeira, Diana and Delaware, are particularly recommended for this purpose at the north, and the Catawba may be added for the Middle States, wherever it does not rot.

Dwarf Apples should not be entirely overlooked in the list of early bearers. Half a peck per tree is often obtained the third year from the most productive sorts.

A good supply of all the preceding, will be sufficient to furnish a family with these wholesome luxuries from within a year or two of occupying entirely new premises; and will not only add greatly to the comforts and attractions of home, but contribute materially to the uniform health of the occupants.

DOMESTIC POULTRY.

VARIETIES, REARING AND MANAGEMENT.*

Origin of Domestic Fowls.

NEXT to the Dog, the Fowl has been the most constant attendant upon man in his migrations and his occupation of strange lands. The carnivorous diet of the dog is one main cause of his pre-eminence. But, search wherê you will, except in the very highest latitudes, and you will find fowls sharing in the possession and settlement obtained by man.

What is the earliest date of poultry-keeping? No one positively knows. It is believed by some that it is coeval with the keeping of sheep by Abel, and the tilling the ground by Cain—a supposition which cannot be far from probability, if there is any foundation for the legend that Gomer, the oldest son of Japhet, took a surname from the cock. By some writers they were supposed to be of Persian origin. The acquisition of the species has not in all probability been an easy conquest; to succeed in bringing them into complete bondage, a long series of attempts and cares has doubtless preceded the successes we now enjoy. They have since been propagated and introduced into general use throughout the whole world, from east to west, from the burning climate of India to the frozen zone. Among every polished nation on earth, and even among nations half-civilized but united in sedentary societies, there is no country habitation around where fowls, more or less numerous, are not met with, which man rears, shelters and nourishes, and which are called cocks and hens. They may be looked upon as a blessing to humanity, and are a species which art has almost entirely wrested from nature. Fowls are everywhere seen in a domestic state, and wild ones are scarcely to be found anywhere; it is not long since it was positively known where the latter still exist in small quantities.

Aristotle, who wrote about 350 years before Christ, speaks of them as familiarly as a natural historian of the present day would. The Roman authors of the Christian era recorded that they classed into such a number of distinct varieties as could only have been the result of long cultivation.

"Among the moderns," says Olivier de Serres, "I am the first that had seen fowls in a state of liberty. In traveling over the gloomy and inextricable forests of Guiana, when the dawn of day began to appear, amidst the immense woods of lofty trees which fall under the stroke of time only, I often heard a crowing similar to that of our cocks, but only weaker. The considerable distance which separated me from every inhabited place, could not allow one to think this crowing produced by domesticated birds; and the natives of those parts, who were in company with me, assured me it was the

* Written for the Annual Register of Rural Affairs, by C. N. BEMENT.

voice of wild cocks. Every one of the colony of Cayenne who has gone very far up the country, gives the same account of these wild fowl, and I have seen one myself. They have the same forms, the fleshy comb on the head, the gait of our fowls, only that they are smaller, being hardly larger than the common pigeon; their plumage is brown or rufous."

Some older travelers have spoken before of these wild fowl of South America. The Spaniard Acosta, provincial of the Jesuits of Peru, has positively said "that fowls existed there before the arrival of his countrymen, and that they were called in the language of the country, *talpa*, and their eggs *ponto*."

But a learned traveler, to whom ornithology in particular is indebted for many capital discoveries, M. Sonneret, has again found the species of wild fowl on the antique land of India, in the mountains of the Ghautes, which separate Malabar from Coramandel. More successful than other travelers, M. Sonneret took home two birds, a male and a female, of the Indian tribe, and published a description of them in his *Travels to the Indies and China;* and he has taken them to be the primitive stock, whence had sprung all the tribes of our domestic fowl.

Fig. 1—Sonneret's Fowl.

Sonneret speaks slightly of Dampier, who mentions that he saw wild cocks in the Indian Archipelago—naturally enough concluding that in this Jungle fowl he had found the primitive stock. Subsequent inquiries have, however, confirmed the statements of Dampier, not only as to the existence of species of wild fowl in the Indian Archipelago, but it is also admitted that the Bankiva species in Java, and the Jago species in Sumatra, more nearly approximate to our common fowl than that now under consideration, and to which Sonneret refers. Upon the whole, it seems that our varieties of domestic fowl proceed from mixtures of original species. Practical observers arrive at much the same conclusion on this point with scientific naturalists. It is thus, for instance, considered in India that our Game cock originated from a mixture of the Jungle cock with wild species in Malay and Chittagong. Altogether, however, it must be admitted that on this disputed point, very little is actually known; and the domestication of the bird ascends to such remote antiquity, that it seems hopeless to ascertain the original species with precision.

THE BANKIVA JUNGLE FOWL.—This beautiful bird (fig. 2) is found wild in Java, and is the most diminutive of its genus, and the stock to which our own Bantams are generally and with much probability assigned. The very term Bantam, a town and district of Java, is sufficient to establish the fact.

Fig. 2—BANKIVA JUNGLE FOWL.

An account has been given of an imported pair of Bankiva fowl, from which, however, no progeny was obtained, either pure or from Bantam hens that were introduced into their aviary; they retained their unsociable demeanor to the last; and after slaughtering several Bantams that had thus been placed with them, they themselves at last fell victims to the superior strength of a Game hen.

A larger variety of Jungle fowl, or perhaps a distinct species, is found on the continent of India, which closely resembles the Black-breasted Game breed of England. It tenants the jungles, and in some districts is very abundant.

THE GREAT MALAY FOWL.—This gigantic breed of fowls (fig. 3) is in high repute with many writers as a supposed link between the wild and the tame race of fowls. It undoubtedly descended from the Kulm or gigantic cock, which is a native of Java, Sumatra, and probably in all other parts of Southern Asia. It is still found on the islands named. Travelers inform us that it is kept in a domestic state not only in India, but in the Malay peninsula, in Cochin-China and China, from whence they are now occasionally imported. It has long been known in Europe and America, although it is only within the last few

Fig. 3—GREAT MALAY FOWL.

years that much attention has been directed towards it in this country. Previous to the introduction of the more quiet Cochin, Shanghai and Brahma, whoever required size resorted almost of necessity to the Malay blood, and a cross of it probably prevails in all the larger breeds. The trifling differences which appear in the kinds mentioned, Martin attributes to the influence of domestication and accidental crosses. It is unquestionably the parent stock of the kinds now known under the names of Cochin, Chittagong, Java, Brahma and Shanghai.

The breed in its pure state is generally not handsome, either in form or plumage, and its flesh is coarse and wanting in flavor. The cock (represented in fig. 3,) shows the greatest purity, and indicates the least departure from the original.

White-faced Spanish Fowl.—Until quite recently few specimens of this noble race of fowls (fig. 4) have found their way into this country. At the period of Mowbray's writing, it appears they were scarcely known.

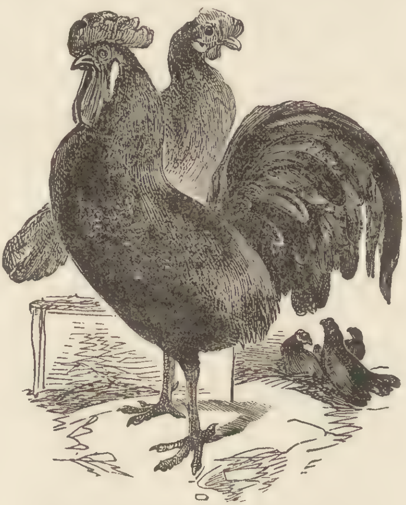


Fig. 4—The White-faced Spanish Fowls.

Like the Black Poland, the plumage of the Spanish fowl is expected to be entirely of that glossy sable color, except glancing greenish tints on some feathers. This, with its quality of being one of the "everlasting layers," makes it a favorite where eggs only are wanted.

The cock is a noble, stately bird, and possesses excellent symmetry. The hen is also of good size and good figure. The combs of both cock and hen are very largely developed, single, deeply indented, and of a bright scarlet; the gills or wattles are very long and pendulous; eyes very bright and spirited; beak moderate in size and a little hooked; face, cheeks and ear-lobes perfectly white, with a bluish tinge underneath, the white extending round the eye, which increases with age, especially in the female; neck of moderate length, but strong; body round and close-feathered; wings of medium size; rather long in the

leg, which is of a dark bluish color; tail a good plume and carried high; a lofty carriage. In the hen—head and beak neat and of a moderate size; eyes bright; comb single, large and pendulous, and falls over; face white, the white extending round the eye; neck of moderate length, neatly set on; body long and breast broad; wings of middle size; tail long, well squared, and carried upright; plumage as in the cock, but less brilliant.

Spanish hens are very celebrated for laying very large, quite white eggs, of a peculiar shape, being very thick at both ends, and yet tapering off a little at each. It is generally conceded, we believe, that Spanish hens will lay more *pounds of eggs in the year* than any other variety. And when we come to speak of them as layers, our award of praise can hardly go too far, either as to actual number of eggs laid or their actual annual weight, varying from 2¾ to 3½ ounces, and sometimes reaching 4 ounces each.

We cannot too much insist upon the value of pullets for laying purposes in the autumn and winter after they are hatched. No fowls can surpass the Spanish in this respect. It is believed they are also more precocious in their constitution, and that in consequence the pullets lay at an earlier age than those of other breeds.

Asiatic Fowls.—Under this head we embrace the Cochin, Brahma, Chittagong and Shanghai. All these fowls take their names from the country and rivers of their nativity.

During the last fifteen years many importations of fowls have been made from India, China, and elsewhere, that are much superior in size, laying qualities, and their general domestic habits, to our common fowls. Among the Asiatic fowls the Shanghais have occupied a prominent position; not, however, as *the best* among us, as many have contended, but as a fowl in many respects superior to our common breed; and the same may be said of the Brahma and Cochin. The Brahmas are generally acknowledged to be at the head of the list in regard to *size*, weighing at maturity from twenty-two to twenty-six pounds per pair.

Fig. 5—Asiatic Fowls.

There seems to be considerable difference of opinion as to whether the Cochins, Brahmas and Shanghais are varieties or distinct breeds. We firmly believe they are one and the

same. One thing is certain—the breed we have in this country as Cochin Chinas are plentiful about Shanghai. "Are Cochin and Shanghai fowls the same?" We have always entertained the opinion that they are, and as we have always invariably found that fowls imported from China into this country, whether feather-legged or plain-legged, whether dark-plumaged or light-plumaged, came hither directly or indirectly, either from Shanghai or its vicinity, we have long since concluded that Cochin, Brahma and Shanghai were of one family.

Characteristics.—The pullets of all Asiatic fowls begin to lay at five months old. The eggs are small at first, but they are numerous, when liberal feeding and warm dry shelter are provided. The egg of the hen averages 2¼ ounces; it is rounded almost equally at each end, so that its shape may be strictly described *oval*—an expression, notwithstanding its derivation, that is by no means applicable to the eggs of some fowls. In color it varies from different shades of buff to a tint approaching cinnamon, and the shell is unusually strong.

There is considerable difference in the Asiatic fowls, some of which are loose-jointed, crane-like concerns, with legs long enough to step over a pretty high fence; these are a disgrace to the tribe. Many persons owning fowls of this description have, after a short trial, discarded them, and justly conclude that there is a great deal of "gammon" in the "hue and cry" about fancy poultry.

Fig. 6—Golden Spangled Chittagongs.

Golden Chittagongs.—This is a new and we believe the last variety of Asiatic fowl introduced into this country. We found in possession of the late David Ely of Rochester, who was a great fancier of fowls, a small lot of Asiatic fowls, which appeared to us as being far superior to any other of the large breeds. On inquiring their origin, Mr. Ely informed us that he obtained them through a friend in New-York, from the master of a vessel direct from China, and that they were called *Pheasant-colored Chittagongs.* He had bred them two years, and found them valuable as early layers and good breeders. He had at the time we first saw them in his yard, nine pullets and one cock, and the ten he assured us weighed over 90 pounds. They were as much alike "as

two peas"—all seemed to have been cast in one mould, both in form and color.

The peculiar beauty of the Spangled Chittagong fowl is certainly in their rich plumage, which renders them objects of attention and interest to the most casual observer. Their general appearance has much of the Cochin character. They are extremely docile and tame in their habits, and a three-foot fence is sufficient to restrain them within prescribed boundaries, on which account we most assuredly believe them one of the best breeds for the poor man and the farmer, considering them, as we do, not as *fancy* but only as productive stock.

THE OSTRICH FOWL.—This valuable variety, we have understood, first originated in Bucks County, Penn.; hence they were called by some the "Bucks County" breed.

The specimens from which our portraits were taken, were presented to the writer by a gentleman of Boston, who informed us he procured them from

Fig. 7—THE OSTRICH FOWL.

Maryland, where they were known as the "Ostrich Fowl." In a letter accompanying the fowls he says, "This breed are the largest of fowls, and from them you will obtain the largest sized eggs. I have had eggs from this breed weighing $4\frac{1}{2}$ ounces avoirdupois weight," &c.

Dr. Kitridge of N. H. furnished the writer with the following information regarding the "Booby Fowl," which, from his description, we take to be the "Ostrich Fowl" under a different name. He says, "Booby is a large fowl, weighing from six to nine pounds. Of those I received, the smallest weighed six pounds, the largest seven and a-half pounds; the cock almost nine pounds. Their invariable color is a black ground with white spots all over them; the legs are black; they are shaped like a turkey. They are great layers, and are not so much inclined to sit as the common hen, laying forty or fifty eggs before they are broody. I procured mine from Montgomery county, Penn."

The color of the cock is a dark blue-black, with the ends of his feathers tipped with white; wings tinged with a yellow or gold color; hackles dark glossy blue; rose or double comb, and wattles large; bold, lively carriage and a stately walk. The hen does not differ much from the cock in color, and is very similar in form, being deep, plump and thick set in body; legs short, of medium size, and of a dark color; she has a high single comb, serrated, generally falling over one side; wattles large.

They are esteemed good layers, good sitters and good mothers; the eggs large and nutritious; the flesh unlike the Malay, but white, firm, tender, and fine-flavored. We consider them fully equal to the Dorking, and they were the fowls usually *caponized* in Pennsylvania and New-Jersey, weighing from sixteen to eighteen pounds the pair. Since the introduction of the Asiatic fowls, they seem to have disappeared, for we hear nothing of them at the present time.

The Dorking.—The colored Dorking has of late been a great favorite in this country, and bred to great size and beauty. The Grey Dorking is a large, plump, compact, square made fowl, with short white legs and ample furnishing. Our portrait (fig. 8) represents a Grey Dorking cock, with a double or rose comb, which is regarded as an essential point. They are considered much more hardy than the white variety.

Fig. 8—Rose-comb Dorking

The great and well deserved reputation which this breed of fowls has acquired in England, arises more from the superior quality of its flesh over that of other fowls, than from its beauty of form, splendor of plumage, the quantity and size of its eggs, or the weight of its body. It is chiefly for the whiteness and delicacy of its flesh that the Dorking fowl is valued, when served at table.

The White rose-combed is *the* Dorking of old fanciers. A writer in the Poultry Chronicle holds with this opinion, and says "the *old* Dorking, the *pure* Dorking, the *only* Dorking, is the *White* Dorking." The same writer curtly describes it as "of good size, compact and plump form, with short neck, short white legs, five toes, a full rose comb, a large breast, and a plumage of spotless white." As regards size, the White Dorking is generally inferior to the colored bird, but in this respect it only requires attention and

careful breeding. The greatest drawback in rearing Dorkings is the delicacy of the chickens. On a fine genial soil, with a good range, they will do well; but without these advantages the chickens die off, and the hens prove indifferent layers.

THE DOMINIQUE FOWL.—This much neglected and overlooked fowl there is good reason to believe is old and distinct, though it is generally looked upon as a mere "farm-yard fowl"—that is, the accidental result of promiscuous crossing. But there are seen to be repeated, generation after generation, the counterparts of which are to be found here and there, scattered over the whole country.

Fig. 9—THE DOMINIQUE FOWL.

For all the purposes of a really *good* domestic fowl—whether for productiveness, easy keeping, laying qualities, quantity and flavor of meat, maternal duties, disposition, beauty of form, or hardiness, after a careful comparison of sorts, we have come to the conclusion that the Dominique fowl is *one of the best.* This is saying much, we know, in their favor, but to our fancy they have no superiors among all the varities in this country. And those who wish to stock their poultry-yards with fowls of the most desirable shape and size, clothed in rich and variegated plumage, and not expecting perfection, are willing to overlook one or two points, the Dominiques are the breed to be at once selected. The hens in addition to their color, have a large comb, which, when they are in high healtn, adds very much to their brilliant appearance, particularly if seen in bright sunshine. The cocks are magnificent. Their peculiarly square built form displays to the greatest advantage. The breeder and the cook behold with delight their short legs, their broad breasts, the small proportion of offal, and the large quantity of high flavored and good profitable flesh. When fatted and served at table, the flavor and appearance of their meat are inferior to none. They are not everlasting layers, but at due and convenient intervals manifest the desire of sitting. In this respect they are steady sitters and good mothers when the little ones appear. The prevailing color is a slaty blue, undulated and shaded with black all over the obdy, forming bands of various widths. The cocks are of the same color as the hens, with now and then golden hackles and brass-colored wings. The legs, feet and bill, are light flesh color or yellow.

To keep the race hardy, healthy and prolific, the best remedy that can be desired is to introduce a fresh, well selected cock or two into the yard every second or third year at farthest.

The Golden Spangled Hamburg fowl, of which fig. 10 is a good illustration, is known in some sections of England as the "Golden Pheasant," from the supposed resemblance of its spangled feathers, especially in the case of some of the hens, to those of the English cock pheasant; and "Red Caps," in allusion to their fiery-colored combs; "Golden Mooney" from the moon-like shape of the spangle marks. In one district of Lancashire they are kept to an extent which has procured for them the name of "Bolton Bays." They have also been known as "Dutch Every-day Layers."

Fig. 10—Golden Spangled Hamburg Fowl.

The Golden Spangled Hamburg cock is a perfectly beautiful bird; nothing but a full sized drawing, colored, can give an adequate idea of the extremely rich coloring and brilliant lustre of his plumage.

The comb of the cock is a very full developed rose, about one and a half to two inches broad, and running into a pike behind; wattles large, rounded, and, like the comb, of an intense red; ear-lobes white and large; hackle a rich copper with black markings, though in some of the best specimens both hackle and saddle feathers are rounded, and have the perfect spangle at their extremity; wings barred by the spangle of their coverts; breast, thighs, and lower part of the body nearly black; tail full, erect, flowing, and bronzed throughout; legs and feet clean and of a dark color. They stand about nineteen inches high, and weigh on an average five pounds and a-half.

The hen has a small rose comb, shaped like the cocks; ear-lobes white; with body, the lower part excepted, spangled as in the cock; neck darker than the body. Her tail is full, and tipped with black like the Sebright Bantam. Height about sixteen inches, and weight about four and a-half pounds.

The hens are the most perfect patterns of neatness of make, but a little under size; excellent and continuous layers without sitting, for they do not seem to have time for that slow process. The flesh is excellent, skin tender, and but little offal. Eggs abundant, rather small, very white, and slightly tapering at one end. Their constitution appears to us less robust than some other varieties.

They are rather impatient of restraint, are great foragers, and add greatly to the embellishment of the lawn or pleasure grounds.

The Bolton Grey is a fine plump, hardy bird, and when bred to nicety can scarcely be distinguished from each other when apart; and when so bred there is not a more beautiful fowl among our domestic poultry. They are esteemed first-rate egg producers, poor sitters, but can hardly fail to be a satisfactory and desirable every-day fowl.

Fig. 11—The Bolton Grey.

Mowbray says of the Creole or Bolton Greys: "This variety, apparently the crack breed of their vicinity, but entirely unknown in the metropolis, is described by Rev. Mr. Ashworth, vicar of Farnworth, as follows:—'Small-sized, short in the leg, and plump in the make. The color of the genuine kind is invariably pure white in the whole lappel of the neck; body white, thickly spotted with black bars at the extremity of the tail; they are chiefly esteemed as very constant layers, though their color would make them good table fowl.'"

The hens, if young, continue to lay nearly throughout the year, which entitles them to rank among the best egg producers; but the eggs, which are white and small, about the size of those of the game hen, weighing about one and a-half ounces each, are rich and fine flavored. As they seem to have no desire to incubate, it is advisable to hatch their eggs under a common hen.

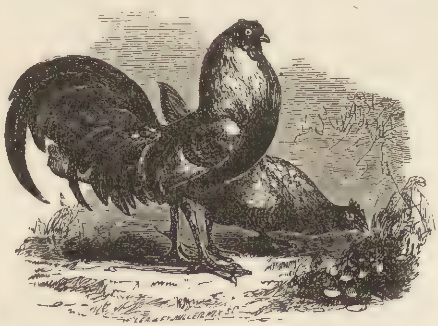


Fig. 12—The Game Fowl.

They are, like the Hamburg, rather impatient of confinement, and succeed best when they can have the run of a pasture or common. They are light on the wing, and seven-feet fences,

when they are intended to be confined, will not be more than sufficient height for their safe custody.

Of all breeds the Game (fig. 12, preceding page) is generally considered the most beautiful, whether we look to contour or to coloring. The cock carries himself proudly and yet gracefully; his port and bearing proclaim his fiery spirit and undaunted mettle, which endure even to his last breath; for while prostrate and mortally wounded, he will answer the insulting crow of his victorious rival, and make a last effort to revenge himself before the spark of life is extinct.

It is not only for its pugnacious qualities that the Game fowl is to be noticed. It yields to no breed, nay, perhaps is superior to most in the whiteness of its flesh; the hens are excellent layers, and the eggs, though of moderate size only, are remarkable for the delicacy of their flavor.

Many persons, however, object to keeping this breed on account of the destructive attacks they make on each other; including cocks and hens, young and old. indiscriminately.

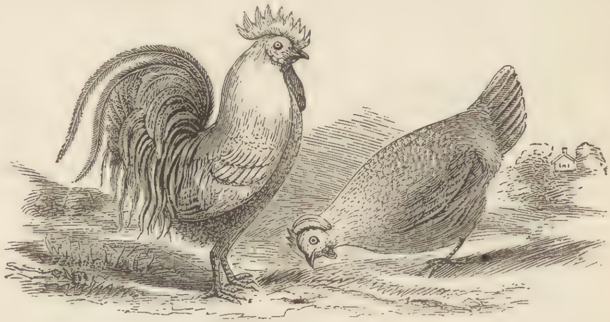


Fig. 13—The Leghorn Fowl.

The Leghorn is a very handsome variety, resembling very much in form, size and color, the Creole fowl, but we are unable to trace its origin. In size they are rather less than the Golden Spangled Hamburg fowl; round and plump in body; legs small and of a lead color; head small, finely turned, and surmounted with a high, deeply indented comb, (as represented in fig. 13.) The comb of the hen falls over like the Spanish hen. The neck feathers of the cock are pure white, while those of the hen are marked with small black spots running into a grizzle; the tail feathers darker with transverse black bars. They carry their tails like the Spanish fowls, and were they clothed in glossy black would pass for fowls of that breed. They are one of the most ornamental varieties, and would add much to the beauty of the poultry-yard. They are chiefly esteemed, however, as layers, but like all great layers are poor sitters.

Fowls in their native haunts, never lay more eggs in a season than they can

hatch. Those who keep every-day layers, as they are sometimes called, should keep Dorking, Game or Dominique hens to do the hatching business.

The portraits of the Leghorn fowls were drawn by a female artist expressly for the ANNUAL REGISTER OF RURAL AFFAIRS.

THE HAMBURG FOWL.—"Of all the gallinaceous tribes," says an English writer, "perhaps there is not one which has created so much discussion as this. The name, the plumage and the markings have all formed, and still do form, subjects for lengthened debate. I use the now established name of Hamburg, not perhaps because it is the best that might have been found to designate the varieties which bear it, but because it has been so long in use, and is so generally used, both here and in America, that an attempt to change it would now only create confusion. I believe the Rev. E. S. Dixon was the first whose arrangement collected the pheasant fowls and Dutch every-day layers under the general name of Hamburg—a classification which has been adopted and followed in the exhibitions and by amateurs."

Fig. 14—THE SILVER PENCILED HAMBURG FOWL.

The Hamburg fowls are distinguished by a large, fleshy, red double comb of extraordinary size and shape; it is flat on top, and yet covered with small upright points, and terminates behind in a sharp point or spike, which is directed upward. In the Golden Spangled variety, this succulent comb is so extra-sized as to have obtained for these birds the name of "Red Caps."

The Hamburg is a medium-sized fowl, with a brisk and spirited bearing, with a short and conical bill; the legs and feet lead color or dull blue; the habit to lay on continuously without sitting; the flesh excellent; the eggs good and abundant; the constitution, perhaps, not so robust as some other fowls. They are profitable fowls to keep, being excellent layers and not large eaters. From these qualifications, to which great beauty of plumage may be added, they are great favorites, especially with amateurs and those who require a constant supply of eggs rather than frequent broods of chickens; while at the same time they have the means of petting their fowls with aviary comforts and indulgences. For this class of poultry-keepers they are better suited than for farmers. They are what pigeon fanciers would call good field birds, delighting to wander far abroad and to seek provender for themselves.

In the Pencilled Hamburg, which fig. 14 is intended to represent, the marking is more minute. When seen at a distance the hens have the appearance of being minutely speckled in plumage, and over this a pure white hackle falls and contrasts very prettily. When one feather is taken separately, the marking is very exact and beautiful, being a regular pencilling; that is, the feather is divided by bars evenly arranged, of alternate white and black. Like the spangles, they are divided into gold and silver for the same reason—the ground color of the plumage. In all these birds exactness of the markings is a great point.

The great point in Crested fowls is the top-knot, which should be large, compact, well shaped and full. In front of this should be a small, bright red comb, divided something after the fashion of a pair of horns. The different kinds are distinguished by their colors. There is the Black, with a white top-knot, the hens of which look like ladies with black satin dresses and coifure of snow-white feathers; the Golden, with the body of an ochre-yellow or brown ground, with dark spangles on each feather; the Silver, with white ground and black spangles. The Black Crested sometimes produce pure white chicks of great beauty, but so tender that it is difficult to rear other white ones from them.

Fig. 15—The Crested Fowl.

The Black with white crests or top-knots, have long been an inhabitant of our poultry-yards; the principal characteristic of which is the large top-knot, so conspicuous in all its varieties. A small spiked comb resembling the horns of a crescent, has been usually regarded as another distinctive feature of these birds; while on the other hand its presence, however slightly marked, has been held by some to denote impurity of descent; and the fowl thus assuming the Polish name, has been termed the "tufted Hamburg."

All Crested fowls are considered good layers, usually commencing early in the spring, and continuing the process, with brief intermissions, till the period of moulting. During winter they are not to be depended on, and other fowls must be sought to furnish the supply of eggs at that season. The Black White-Crested are usually considered the best layers; and the average weight of their eggs is placed at two ounces.

Bantams are old-established pets of poultry fanciers, both of low and high degree. They are the dwarfs and imps of their tribe. They are pugnacious among themselves, troublesome and impertinent towards larger fowls, but

maintain their ground in public favor from their neat and pleasing appearance, the plenty of their eggs, their usefulness as nurses, the great service they render as destroyers of grubs and insects, and the small extent of accommodation necessary for them. In old times they were mostly feather-legged, like the accompanying figure. These have been discarded, and clean-legged varieties have been substituted.

Fig. 16—Bantam Fowls.

"There can be but little question," says the editor of the English Poultry Book, "that to the islands of the Eastern Archipelago the origin of this lilliputian family must be referred; but whether all our present varieties owe their descent to any other primitive stock, may be the subject of speculation, indeed, though hardly, at the present day, capable of proof. Bantam, however, a town and district of Java, has afforded their present designation; and the wild Bankiva fowl is the bird to which they are usually considered to owe their origin."

Fig. 17—Golden Spangled Bantams.

In the English Poultry Book there are seven varieties of Bantams enumerated, viz.: The Nankin Bantam, the Game Bantam, the Spangled Bantam, the Sebright Bantam, the Partridge Bantam, the Black Bantam, and the White Bantam.

The kinds most in vogue now are the Black and the Sebright; but the

Nankin are as pretty and useful as any. Some of those are almost perfect miniatures of the Golden Spangled Hamburg fowl. A great peculiarity in the Sebrights is, that the cock has no sickle feathers in his tail, as seen in figure 17, but is what is called "hen-tailed." Of these there are the Golden and the Silver; the ground color of the plumage in the one is a rich brownish-yellow; in the other white, or more frequently cream color. Each feather is spangled with dark-brown black. The finer and more perfect the spangles are, the greater are they valued. The weight of the cock ought not to be more than twenty ounces; that of the hen not more than one pound. We have a hen that weighs only twelve ounces!

Fig. 18—Silver Spangled Bantams.

This is, perhaps, the most beautiful bird of the whole family, and immediately reminds one of its Hamburg namesake, both in respect to the color and form of its markings, as also the shape of its comb. Many persons, indeed, would suggest the probability of their being the offspring of crosses between the above birds, in the same way as the Game fowl and Bantam.

The pair figured above are the property of M. Vassar, Esq., of Springside. They are beautifully marked; the tail of the cock is without sickle feathers and carried high; and the head thrown back, the head and tail nearly meeting; the wings jauntily dropping until they nearly brush the ground; they have a rose comb nicely pointed, and projecting behind; and light blue legs

The accuracy of marking, in both the Gold and Silver, is a very important point. The ground color is ivory-white or rich cream, the ends of the feathers tipped with blackish. The cocks are hen-tailed as well as hen-feathered; they have neither hackles nor plumes.

The plumage of the hen is similar to that of the cock. They are very good and early layers, most excellent sitters, sedulous and affectionate mothers, but murderous step-mothers—that is, if you attempt to change or add to the number of the brood they have hatched themselves; they will welcome the little strangers by making raw heads and bloody bones of them, before you can say "Jack Robinson." Their chickens are of a creamy white, with two longitudinal dark stripes on the body.

The Bantams are the fowls of all others for the village or city. We have known them to prosper and lay through the winter in an underground room or cellar, well lighted. They are very domestic, often making their nests in the kitchen, depositing their eggs in the cradle or cupboard when permitted. They have been known to lay even in a lady's work-basket.

The Black Bantam, in his appearance, is a pleasing little fellow, a most beautiful example of a great soul in a little body. Though extremely small in size, the cock is elegantly formed, and remarkable for his grotesque figure, his courageous and passionate temper, his amusing pompousness of manner, his overweening assumption and arrogance, and his propensity to fight and force every rival to "turn tail," has caused him many difficulties. He will attack a turkey, Cochin or Brahma, ten times his own weight. He is more jealous, irascible and domineering, in proportion to his size, than the thorough-bred Game cock himself. His combativeness, too, is manifested at a very early period. Other chickens will fight in sport by the time they are half grown, but these set to work in good earnest.

Fig. 18—Black Bantam.

These beautiful emblems of pride and consequence are peculiarly fancy fowls. They have been accused of not being a useful kind, as of course there is little meat in a fowl which, when full grown, should weigh, the cock about one pound, the hen less—the eggs being small in proportion; but their eggs are delicacies which would tempt almost any invalid. They must be considered more an object of curiosity than utility, and of course must expect to be viewed with no peculiar favor in this country except as "pets." They no doubt do much good by the consumption of numerous insects.

The portrait was drawn and engraved expressly for the ANNUAL REGISTER OF RURAL AFFAIRS.

Management of Poultry.

Having given a short history and description of the various kinds of fowls most generally bred at the present day, we will now proceed to mention a few points requisite for the successful keeping of poultry.

As in the management of milch cows, so with fowls, it is as necessary to feed and to quarter, and to care for and select your stock with judgment. An ordinary breed of hens, well housed and well fed, will be of more profit to their owner than the like number of neglected and forlorn biddies, who came of the best laying tribe.

It becomes us, therefore, to build houses for our poultry, convenient for their habits, and convenient also for our own; for if attendance of any kind of stock occasions too much trouble, they will often be neglected. In building, therefore, let the house be handy for the hens, and as handy for yourself as possible; and of the two, we would say, in preference, make it handy for feeding, and for cleaning and warming and ventilation, as the hour or season of each comes round.

Let their feeding hoppers and water fountains be in the building, or they may occasionally lose a meal when you are too tired to go after it. Let the facilities for cleaning their apartments be always at hand; or the atmosphere of their dormitory may chance to be overcharged with ammonia. For the same reason let your windows work easily; and by all means whitewash the interior of the house, roosts, nests and all.

It is well known that hens are modest birds, and seek seclusion and privacy while the symptoms of approaching egg-labor are strong upon them. It is thought by many that the production of eggs is like the yielding of milk in a cow, somewhat under the control of the creature; so it becomes us to add every inducement to stimulate the instincts of nature; and coax a fowl to prolificacy by consulting their tastes and whims, and making the nests as secret as possible.

The principal considerations of a poultry-house, are warmth, light and ventilation. Warm in winter, because fowls will require less food, will be healthier, and will lay more eggs. Ventilated in summer and in mild winter weather, because fresh air is absolutely essential to all animated nature, and particularly to the fowl. Well lighted, because the fowls delight to be in a cheerful place, and to bask in sunshine admitted through the windows of their tenements in cold weather.

Whatever the breed or number of fowls intended to be kept provision must be made for their comfort and safety. Fowls attached to farm-houses lead a happy life. They have air and plenty of room, with no lack of food: they wander about the farm-yard, visit the adjacent fields, travel over the common or down the lane, troop about the barn, and enjoy the greatest freedom. But how are they housed at night? Often in a proper and well

Fig. 20—Winter Fowl House.

constructed poultry-house, with perches judiciously arranged, and with clean and convenient boxes for the hens to lay in, but sometimes in places utterly unfitted for them; they are allowed to find a place to roost where they can, probably in some exposed situation in a tree, out-house, or open shed, above the wagons, carts, &c.; others shelter in adjacent out-houses, and some in the stable. This want of order cannot be too much condemned. The hens having no proper laying places, select such as chance may offer them, not unfrequently in obscure places of concealment; consequently a safe and convenient fowl-house should be found on every farm where poultry is kept, and the fowls should have their exclusive dormitory. Farm-yard poultry are in general healthy and vigorous, nimble on their feet and light on their wings, and the feathered denizen of the yard of limited space, of a home in a village, may well look on them with envy. But in poultry-keeping, as in every other pursuit, we must not commence without counting the cost, or fancy that the purchase of good fowls is the only or the chief thing, and that when once started they will need no further care. If any other kind of farm stock was set adrift, and expected to do without regular feeding and attendance, the result would be a miserable failure and loss; and so with poultry, success need never be expected without the necessary outlay of care and attention.

In a sequestered nook, amidst a cluster of trees, on the sunny side of a steep bank surmounted by rocks covered with shrubbery, may be seen the new Winter fowl-house (fig. 20) lately erected at Springside. This location was selected by the writer for the purpose of protection from the cold

northern blasts, and receiving the warmth and benefit of the winter sun. The deciduous trees in front being deprived of their foliage in winter, admit the full influence of the sun, and when in full leaf, to shade and ward off his scorching rays in summer.

Description.—The elevation, as will be seen in the figure, is rather a pretty affair. The center building, with the gable to the front, is 12 feet square; 8 feet posts. The roof very steep, and surmounted with a kind of cupola, for the purpose of ventilation and ornament; in the bottom of the cupola are two small swing doors, to close when necessary. The entire front is of glass, extending to the very point at the top.

The left wing is a lower edifice, 22 feet long and 10 feet wide. The floor is of broken stone, covered with fine gravel, sunk 2 feet below the surface in front, and 8 feet in the rear. The back wall resting against the back, is of stone, 22 inches thick, faced with brick. The roof has a gentle pitch to the rear, and made of 1½ inch plank, tongued and grooved, joints painted with white lead before being laid. The under sides of the rafters are lined with hemlock boards, the spaces between the rafters filled with tan, rendering it frost-proof. The front wall is of brick, and 2 feet high, on which the wood and sash rest. In the base are gratings to admit air; also above the glass, and just under the eaves, are open spaces for ventilation.

Internal arrangement.—In the rear, and running the whole length of the room, are two tiers of boxes for nests, 18 inches square, and the same in height. Adjoining the nest is an apartment of the same, a kind of ante-room, where the hen enters to go to her nest, which is latticed in front, giving air and apparent secrecy, with which she seems much pleased. The under tier 2 feet above the floor. The range of tiers is set out from the back wall 10 inches; the top front 28 inches. These nests are covered with boards sloping back and down, like the roof of a house, to catch and carry down the droppings of the fowls from the perches immediately over, to a trough in the rear. By this arrangement the manure is all saved, and out of the way of the fowls. We kept fifty Spanish fowls in this house last winter, without injury to their large combs or wattles by frost. We also wintered the same number of Bantams in the center building, furnishing us with fresh eggs during the whole winter.

A very cheap and economical plan for a rustic fowl-house may be constructed something after the above figure, which can easily be made by any person accustomed to the use of the saw and axe. All that is required is a little taste, having the plan well digested before commencing, so as to require no alterations. After selecting the situation, join four pieces of sapling in an oblong shape for the sills; confine them at the ground, and erect at the middle of the two ends a forked or crotched post of suitable height, in order to make the sides quite steep; join these with a ridge pole; rough board it from the apex downward, by the sills to the ground; then cover it with bark, roughly cut in pieces one foot square, laid on and confined in the same

manner as ordinary shingles; fix the back end in the same way; and the front can be latticed with small poles with the bark on, arranged diamond fashion, as shown in the sketch—a part to be made with hinges for a door.

Fig. 21—Rustic Fowl House.

The size of the building may vary according to the wants or taste of the owner. Toward the apex of the interior, rough roosting poles should run parallel with the sides of the house, so arranged that one set of fowls shall not perch directly above the others. Troughs or boxes should be placed under the poles, in order to catch the manure; and ladders or steps should be provided for the fowls to ascend and descend from their roost. Laying or sitting boxes may be placed either side of the building, under the roofing on or just above the ground. They should be about fourteen inches square, ten inches deep, and partially concealed by bundles of cornstalks, wheat or rye straw, faggots or pine boughs. The sitting-boxes should be partly filled with wood ashes, pulverized charcoal, or soot. These

Fig. 22—Aquatic Fowl-House.

are slow conductors of heat or cold, and when once warm they will impart a proper temperature to the eggs during the absence of the hen. They will also ward off lice and other small vermin, as well as contribute to her health. Directly above the ashes, &c., should be the nest. It may be made of finely chopped hay or straw, dried grass, or the leaves of trees.

Something after the style of fig. 22, (represented on the preceding page,) placed on the bank of a lake, pond, or small stream, and half covered with climbing plants, would make a very pretty home for ducks or other aquatic fowls.

The plan and elevation of a very cheap and pretty model of a poultry-house, which can be made to accommodate from twenty to one hundred fowls, was given on page 69 of the first vol. of this work.

For the accompanying sketch and plan of a beautiful poultry-house, we are indebted to the editor of the *New-England Farmer*, who says, "In consideration of the profits arising from the keeping of poultry, as well as the very general interest now taken in this delightful feature of the farm, we have devised and had engraved the beautiful poultry-house here represented, and we think will be acknowledged by all a model house. The front should face the south, and the yard placed on either side, as taste or convenience may suggest; but so long as the ground is uncovered, the fowls would enjoy a range on the south, and would be benefitted by coming to the ground. After snow falls they will rarely leave the building."

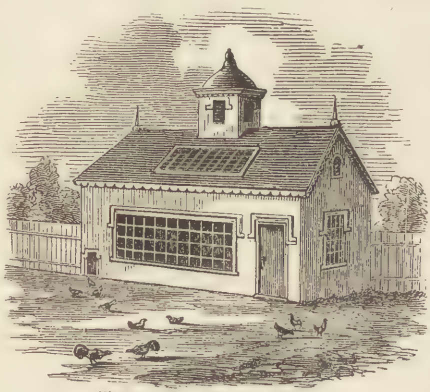


Fig. 23—Model Poultry-House.

A house of the above descpiption, eight feet wide, thirteen feet long, and eight feet posts, will accommodate from twenty-five to thirty fowls, and that is as many as any family would find it profitable to keep, unless they have a wide range. If confined or restricted in their freedom, a yard of one-fourth of an acre would be large enough, provided a portion should afford grass, and a dense shade of low trees and shrubs, to which the fowls may retire in hot weather, where they will bask in the sand, and spend much of their time in a sociable and agreeable manner.

Fig. 24 (on the next page) is the ground plan and internal arrangement; *a*, is the entrance door; *b*, the grain chests; *c*, the feeding boxes; *d*, the stairway to the loft; and *e*, a small door or opening for the egress and ingress of the fowls, which should be at least two feet above the surface of the ground. The opening at the left of *a* is the doorway from the entry into the main poultry-room. Directly over the feeding boxes there may be placed another row for nests, three or four feet from the floor. which may be exa-

mined through a slide from the entry without entering the main room, or disturbing the hens while on their nests. These boxes may be darkened and

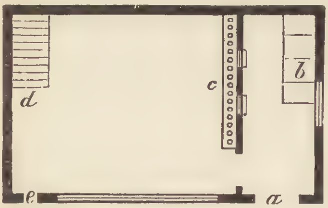


Fig. 24—Ground Plan.

made a little secret, by placing a shelf along in front of them, and nailing a board edgewise against it, "and as Miss Biddy, like some others of the gentle sex, is a little prudish at times, it is well enough to indulge her fancies." The fowls will find a warm place in the winter, on the floor under the window in the roof, in which to congregate. The roosting poles should be placed crosswise of the gable and over the entry or ante-room, and commencing at the top or peak, say one foot from the end of the building, the second about 18 inches distant and 12 inches lower, and so on, like the steps of a ladder, to the floor, which will accommodate the larger fowls, which often injure themselves flying up and down from the roosts.

Fig. 25 represents the elevation of a neat, pretty and convenient poultry-house, designed by the writer, and erected near Factoryville, Staten Island.

Fig. 25—Octagon Poultry-House.

It is designed to accommodate from twenty-five to thirty common-sized fowls. The octagon was preferred on account of economy, as it takes less materials and labor to enclose a given number of feet in an octagon than in a square or oblong form. Where different varieties of fowls are to be kept separate, the apartments may be enlarged, and the yards radiating from each square of the building. The object of placing it on piles was to prevent the encroachment of rats, mice and other vermin. Rats are particularly annoying, as they not only devour the grain, but suck the eggs and kill the young chickens. Where fowls were fed from a trough on the ground, we have known them to contend with and even drive the fowls from their food.

This building is ten feet in diameter and six and a-half feet high. The sills

are four by four, and the plates three by four joists, halved and nailed at the joints. It is sided with inch-and-a-quarter spruce plank, tongued and grooved, the joints battened on the outside. No upright timbers were used. The floor and roofing are of the same kind of plank. An eight-square frame, eighteen inches diameter, supports the tops of the rafters, leaving an opening of ten inches diameter, over which the cupola is placed for a ventilator. In place of the cupola, a vitrilized stone chimney, such as are used sometimes on cottages. The piers should be either cedar, locust or chestnut, and at least two feet high, and set on flat stones.

The internal arrangement is as follows: A post may be set in the center, under the cupola, for one end of the roosts to rest on, the other end to the wall. The first or lowermost one two feet from the floor, and the others eighteen inches apart, and rising gradually to the top in a spiral form, six feet from the floor. Underneath these roosts is a board floor, on an angle of about forty-five degrees, to catch and carry down the droppings of the fowls. This arrangement renders it much more convenient in cleaning out the manure, which should be frequently done—at least once a week.

The space beneath this floor is appropriated to tiers of nests, 15 inches wide, 18 inches deep, and 18 inches high. In order to gratify their propensity of secretiveness, the front should be latticed, by which arrangement a free circulation of air is admitted, which adds much to the comfort of the hens while sitting.

The elevation cut on the preceding page, is taken from the new editlon of "The American Poulterer's Companion," published by the Messrs. Harpers, where quite a number of plans may be found.

NESTS.—Nests are sometimes fixtures, and generally built against the wall, either in one tier or several, according to the number of fowls and the size of the house. When there is more than one tier, each of those above the ground must have a projecting shelf at the bottom, for the hens to alight on when going to their nests, which they reach by means of a slanting board with strips of lath nailed across for a ladder. But we prefer, and would by all means recommend, movable nests arranged along the wall, with a shelf in front, and a sloping top or cover, so that the hens may not roost on it and annoy our notions of tidiness by the traces we should find there the following morning. The hen is a prude, and likes to steal away in some sly place to deposit her eggs. To gratify their organ of secretiveness, we recommend tacking cedar or hemlock bows to the front, as represented in fig. 26, nearly closing the entrances, giving the hen an appearance of obscurity, and an opportunity of gratifying her natural propensity. This arrangement seems very satisfactory to the hens, besides adding much to the appearance of the house. Where evergreens are not at hand, fine lattice work will answer an equal purpose. It is amusing, too, when you enter the house, to see how sly and cunning they look in their cosy and, to them, private nests.

In large poultry-houses, where a great number of fowls are confined, it

Fig. 26—Secret Nests.

would be well to have sitting-nests so formed as to keep them secure from the intrusions of the hens who have been in the habit of depositing their eggs there. One reason for adopting this system of apparent—but only apparent—restraint, is principally to prevent those friendly visits of other hens, which are always anxious to insure a numerous progeny to their neighbor by adding their own contributions. This, however, not being usually approved of by her ladyship in possession, a scuffle is frequently the result at the expense of the eggs, which are thus too commonly broken or injured.

We have found, too, that the daily absence of the sitting hen for food and exercise, has been waited for by the other members of the poultry-yard which are about to deposit their eggs, and that they will avail themselves of such absence to mount the place of honor and prevent the rightful owner from returning.

The confinement of the hen is effected either by having a sliding board perforated with air holes, or wire-work that may be drawn across the entrance; or where the front of the nest is open, a bar to let down, of sufficient width to prevent either egress or ingress.

Pens, Coops, Feeding Hoppers, &c.

We have sometimes found it necessary to separate some fowls from the rest; such as those which are liable to be ill-treated by the others, as also strangers, and fowls of particular breeds. Pens and coops are useful for this purpose, which may be made in various ways and at trifling cost.

Fig. 27, (on the following page,) which we take from "The American Poulterer's Companion," represents a neat and useful pen for keeping a cock and three or four hens for breeding, where they can enjoy the sun and fresh air, and yet be protected from stormy weather; and it may in some instances serve instead of a poultry-yard. It has a house to roost, lay and hatch in, and an open part for exercise.

The dimensions are as follows: The shed may be four to six feet high in front, the roof sloping to three or four feet in the rear, with windows in the ends to give a free circulation of air. It may be six feet long and four feet wide. The entrance, which is not shown in the figure, is in the yard. The yard may be ten feet long and six feet wide, to correspond with the shed. The yards may be enclosed with panels of lath or rails four feet high, and the top covered with the same to keep the birds from flying over. The same plan may be reduced to a size suitable for a hen and her chickens. The coop, for that purpose, should be twenty-two inches high in front, and eighteen inches in the rear, and twenty inches square at the bottom. The top opens, and there should be a sliding door in front to shut in the hen. The front or yard may be four feet long, slatted with laths, with a hole cut through the bottom, as shown in the figure, for hens to scratch in. It is light and easy to be removed from one place to another, which should be done daily. The tight and open part answers the double purpose of sitting the hen and keeping her and the chickens in until they are enabled to take care of themselves.

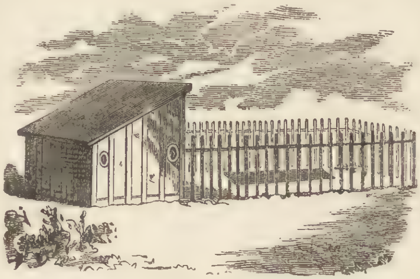


Fig. 27—Pen.

The late Col. Jacques remarked that chickens could be raised as well without as with a hen, even though you take the chicks away in an hour or less after coming from the shell. In order to do this you want a small coop built in a lean-to shape, three to five feet long, high, and wide in proportion, with a small door in front, and two squares of glass to admit light and sun when cold and rainy. A piece of sheepskin, with the wool on, nailed to a board, would answer for them to run under and get warm.

Chicken Coops.—To give the chicks the best chance of life, the hen should be confined in a coop, under a shed or out-house, until they are about four weeks old; and in cold weather a week or two longer. The coop, however, should be moved into the sunshine, and on grass if possible, whenever the temperature is sufficiently mild.

For early spring chickens we found the following method to answer an excellent purpose. Take a large size dry-goods box, remove the top and put a sash-light in its place, and if not large enough to cover, fill the space with a piece of the lid, and if not wide enough to make a hole sufficient to let the chicks pass out and in, remove one of the lower lights and substitute a door, and secure it with leather hinges and a button. In this door cut a hole near the bottom three inches in diameter, with a slide to close the hole when

necessary. In order to secure more influence from the sun, strike a line on both ends, from the bottom upward to a point six inches from the top edge; saw these pieces off as also the six inches of the top, which will give an inclination to the sash something like a hot-bed frame. The feed and water can be put in at the door in the bottom of the sash, or a part of the top may be removed for that purpose. We had several made in that way last winter, and never lost one chick except by casualty. On placing this coop facing the morning sun, it was surprising to see how soon it would show its genial influence. The little fellows would lay on their sides, turn up their wings, stretch out their legs, and seem to enjoy real comfort. The bottom should be strewed with dry sand mixed with ashes.

The accompanying figure of a coop will be found very convenient. It may be made also of a dry-goods box, or of inch boards, long enough to admit two or three hens with their broods, but it is better to have them separate, as some hens are vicious, and kill strange chicks if they should happen to come within their reach. The thing is so simple it hardly needs an explanation. A A are slats for admitting the hens; B B, doors to open and shut at night, to prevent the intrusion of rats or any kind of vermin; C, button for securing the doors.

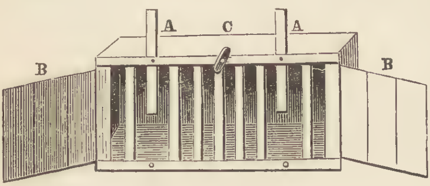


Fig. 28—Close Coop.

In all cases a warm, dry and quiet place should be chosen for the coops, near the house, on account of the convenience of feeding them, and where the chicks are not in danger of being trod on either by man or beast, nor where the hen will suffer from the intense heat of the sun in summer, or where there is danger of the chickens being carried off by the hawks or crows.

The Marquee or tent-shaped coops, of which fig. 29 is a representation, we have used for a number of years, and have found them very efficient during the summer, if we avoid placing it on damp earth during the early days of its inmates, though it does not afford the same degree of shelter as the one to be described.

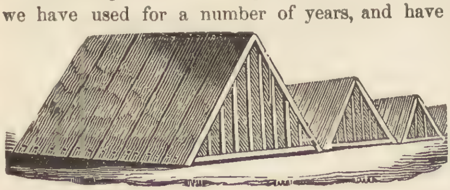


Fig. 29—Tent-shaped Coops.

The tent coop is formed by nailing pieces of boards, two feet long, in such a way as to form two parts of a triangle, the ground forming the other side. In warm and *dry* weather, we consider it better to have them next the earth;

but in the early spring, when the weather is cold and the ground wet, a floor or platform of boards, or an old door, should always be put under the coops. It should be at least two feet long, or if three feet, would be better, and twenty-two inches high in the center. The back end should be boarded up tight, with the exception of a small hole at the peak to admit a circulation of air. The front should be secured by nailing strips of lath, as denoted in the figure, leaving sufficient space between them for the free passage to the chicks, without affording liberty to the hen. In front there should be a broad strip of board, the width of the coop, on which to feed them. This board may be secured to the bottom bar of the coop with hinges, so as to admit of its being raised up to close the coop toward evening, which will not only answer the purpose of guarding the young brood against rats and other enemies during the night, but will prevent the chicks from wandering about the next morning on the dew and wet grass.

The most common method employed for the purpose of confining the hen with her young brood, is to drive stakes into the ground in front, and make a pen about two feet square and cover with boards; but a better plan is to lay a flour barrel on its side, with one end out, and drive a few sticks in front, (fig. 30,) protecting them from rain and winds, and allowing the chickens to range about the yard, where they are enabled to pick up seeds, insects and worms, by which means they obtain a large share of their living. We say nothing of the poor nen's state of mind while confined herself, but with her young brood at large, she witnesses their erratic conduct, and their danger from hawks, rats, cats, or ill-temper or spitefulness of some of her own race, which often terminates in her "scrabbling" to death (a truly emphatic term, indicative of her peculiar notions under excitement of this kind,) those of the brood which first answer the summons of recall, while others are still truant. Her feeling, therefore, should be studied for our own sake, no less than for hers.

Fig. 30—Barrel Coop.

Most farmers are in the habit of feeding their fowls from the hand, strewing it over the ground, while others throw down corn in the ear in a heap, and permit the fowls to help themselves. This is considered a slovenly and wasteful mode, and well calculated to invite rats and mice. In our experience we have found it more economical to keep grain constantly before them, and for that purpose adopted feeding hoppers.

As we were constantly annoyed by the depredations of rats, in order to avoid their annoyance we had several feeding hoppers made, but preferred the one represented by fig. 31. Its construction is so simple, that a man or

boy who can handle a saw, a plane and a hammer, with a few nails, could make one in a few hours, and it would cost but a trifle.

The following are directions for making one: First make a platform three feet square; then make a square box of inch-and-quarter plank, three inches high and sixteen inches square; nail this square in the center of the platform; saw four strips one and a-quarter inches square for the posts, which should be about eighteen inches high; nail strips of plank, (which are not seen in the figure,) two inches wide, to the posts at top, to secure and steady them; then take common sawed lath, or thin strips of board one and a-half inches wide, and nail them to the top and bottom up and down, leaving a space of two inches between each slat, which enables the fowls to insert their heads to pick the grain. The roof may be formed four-square like the engraving, or it may be made flat or pitching on two sides like the roof of a house, and should be detached, so that it can be raised when required to be replenished with grain.

Fig. 31—Feeding Hoppers.

In order to make it proof against rats and mice, it will be necessary to elevate it at least three feet from the floor, if in a building, and this can be done by suspending it with wires at each corner, and attached to the timbers or rafters above; the wires being small and smooth, the rats and mice could not pass up or down on them. If it is necessary to place the hopper in the yard, it may be placed on a post three feet high, and firmly set in the ground, as shown in the figure; the platform projecting so far from the post, it would be rather difficult for either rats or mice to climb up the post and on the under side of the platform.

It is surprising how soon the fowls will learn to leap upon the platform, and feed from the grain-box between the slats. From ten to fifteen fowls can feed at the same time.

Diseases of Poultry.

In this climate the diseases of our poultry are few in number, and are frequently controlled by proper treatment. On this point it is said with truth, that "prevention is better than cure," and when the former cannot be altogether secured, the latter must be attended to immediately, or all attempts at a cure will prove fruitless. When disease is discovered in an individual, it should be removed from the others as soon as discovered, and put by itself, or it will spread over the whole flock. Under proper management, Nature is a prudent guardian to fowls in health, a kind nurse to them in weakness, and the most

skillful physician in disease. With her, man should do no more than co-operate; and this we can do most effectually by adopting every proper means, by accommodation and diet, to preserve them in a proper state of health.

GAPES.—Of all diseases to which chickens are subjected, the most frequent are the gapes. It is a very common and troublesome disorder, and often proves fatal. Young chickens are peculiarly liable to it, and generally in the hot weather of July and August. By some it is considered a catarrhal disease, similar to the influenza in human beings, producing a thickened state of the membrane lining the nostrils, mouth and tongue. By others it is supposed to be caused by a sort of intestinal worm infesting the windpipe; but though this may have in some instances been observed, it is by no means uniformly met with in all the diseases accompanied with gaping.

CAUSE.—The gapes is supposed to be produced from filthy, sour diet, and drinking from dirty puddle water infected with putrid decaying substances, ill ventilated fowl-house confinement, on a spot of ground tenanted year after year by fowls, without attention to cleanliness, to renovation of the soil, &c. At the same time let it be borne in mind that the "gapes" is an epidemic.

SYMPTOMS.—The name is sufficiently expressive as to the symptoms of this disease: gaping, coughing and sneezing, dullness and inactivity, ruffled feathers, drooping of the wings, and loss of appetite.

On dissecting chickens dying with this disease, it will generally be found that the windpipe contains numerous small red worms about the size of a cambric needle; on the first glance they would likely be mistaken for blood vessels. It is supposed that these worms continue to increase in size until the windpipe becomes completely filled up, and the chicken suffocated. The disease shows itself when the chicken is between six and eight weeks old, and not generally after four months old.

TREATMENT.—The plan usually adopted of giving remedies internally to remove the worms, has not always proved successful; direct application to the worms, therefore, is preferable. This is readily secured by stripping the vane from a quill-feather, (fig. 32,)

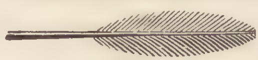


Fig. 32.

except an inch from its extremity; wet it a little, then let the operator take the head of the chicken in his left hand, placing his thumb and fore finger on each side of the bill in such a manner as to hold the mouth open, the neck gently but firmly drawn out in a straight line, then gently passing it down through the small opening of the windpipe, which is readily seen at the base of the tongue, and giving it one or two turns, then draw out, and turn the feather, and the worms will adhere to the feather, and others will be loosened, and the chicken will sneeze them up, so that they will fly out of its mouth. It is not advisable to enter the feather more than twice at one time; let the chicken go, and if it gapes the day after, you have not got them all; try again. This is a sure cure if attended to; generally you need not perform the operation more than once, but sometimes oftener. As many as eleven worms have been taken at one haul.

Another method we find communicated in the Country Gentleman. The writer says, "The process of removing them (the worms) is this: One person holds the chicken firmly in one hand, with the finger of the other hold down the tongue; a second person, (for it is impossible for one to do it alone,) doubles a long horse hair, and inserts the loop carefully through the opening of the windpipe,* pass it down as far as it will go, twist the horse hair a few times, then draw out, and the worms will be found caught in the loop."

"In making the trial with the horse hair," continues the writer, "some difficulty at first is experienced in holding the head of the

Fig. 33.

chicken still while performing the operation, as the windpipe is very sensitive: hence I have sketched the position of the fingers (fig. 33) in which the head may be firmly held without harm to the chicken. While in this

position the windpipe may be seen, and the sole cause of its distress. If the rays of the sun are perm'tted to fall upon its throat, the worms are most distinctly seen.

"The horse hair is tied in the manner shown in fig. 33, and is most expedient, as other knots cause the loop C to deviate from a line straight with A and B, making it difficult to introduce into the windpipe. The loop is about half an inch long, and must be rolled between the thumb and finger to make it angular, as at C. The introduction of the hair must first be by a quick push, and kept in its place until it can be forced down, lest the coughing of the chicken should expel it. It should be put down about an inch and a-half, and twisted in its course upward. Each operation should be performed in six to eight seconds of time. It is not absolutely necessary to remove every worm from the windpipe. Coarse hairs are better than fine ones for the purpose."

The annual mortality among chickens is a subject of general regret; but as we believe preventive means may be used, which will in a great measure save a large majority of those which otherwise would fall a sacrifice to those diseases which usually prey upon the feathered tribe, we will briefly suggest a few practical rules, which, if adopted, we believe will answer the desired object.

1st. All young chickens, ducks and turkeys should be kept warm, under cover out of the weather, during rain or stormy seasons.

2d. Twice or thrice a week, pepper, shalots, chives, onions, or garlic, should be mixed with their food.

3d. A small lump of assafœtida should be placed in the pans in which their water is given them to drink. If the vessels should be of rusty iron all the better.

4th. Chickens which are kept from the dung-heap while young, seldom have the gapes; therefore it should be the object of those who have charge of them, so to confine the hens as to preclude their young from the range of the horse stables and yards.

5th. Whenever they manifest disease by the drooping of the wings, or any other outward sign of ill health, a little assafœtida dissolved or broken into small lumps, should be mixed with their food.

6th. For the Snuffles, the remedies for gapes will be found highly curative; but in addition to them it will be necessary to melt a little assafœtida in fresh butter or sweet oil, and rub the chicken about the nostrils, taking care to clean them out.

7th. The worms in the lungs of chickens are supposed to be produced from the inhalation of the eggs of the hen lice. The minute eggs are deposited in the feathers and down of the hen, and the chickens being hovered over by her, the eggs are drawn into the cells of the lungs at each inspiration, which hatch and produce the worms which smother the chickens. Remedy—sulphur and tobacco about the nests during incubation.

Hens while hatching are very apt to become infested with lice; so much so they are often driven from the nest. We have known the eggs covered, and the nest alive with them. In such cases we recommend removing the litter and eggs, and cleaning the nest with scalding water Then line the nest with tobacco stems.

WEEDS AND THEIR DESTRUCTION.

A weed has been properly defined as *a plant growing out of place.* Clover and timothy, so valuable as farm crops when occupying meadows and pastures, immediately become weeds if they intrude into corn and potato fields. More usually, however, the term is applied to those plants, which, in all places and under all circumstances, persist in growing where they are not wanted, and are never cultivated for any useful purpose. Such are the Canada thistle, Oxeye daisy, Johnswort and Chess. Agriculturists have two prominent questions to ask in relation to all such plants—the first, how they found their way into their fields; and, secondly, how to get them out. The first is for the purpose of pointing out the prevention, and the second for prescribing the cure. It will be of little use to destroy weeds by the hundred, if we permit them to enter by the thousand or million.

The prevention requires a thorough knowledge of the habits of the plant, and its mode of propagating itself. Some weeds, as annuals, increase only by seeds, such as the pig-weed, foxtail and mustard. Biennials, as the mullein and burdock, mostly come under the same head. Some of these, although the individual plants soon die, maintain their hold by the long vitality of the seeds, with all the pertinacity of the most enduring perennials. The latter increase not only by seed, but by the extension of the roots; such are the Canada thistle, milkweed, and couch grass. Annual plants, as the field mustard, prove most troublesome to spring-sown crops; while biennials, as cockle, chess and red-root, find their way among biennial crops, as rye and wheat. Perennial weeds intrude into all—yet they are not necessarily the worst weeds; some annuals, for instance, increase with more rapidity and certainty by the prodigious multiplication of seed, than any others by extension of the roots.

There are two GENERAL RULES for the prevention and extirpation of weeds, applicable in all cases, that every farmer should fully understand. The *first*, from the well known fact that *no plant can first grow without starting from a seed*, indicates the general caution to destroy all weeds before they can ripen their seed, and to sow for crops nothing but perfectly clean seed. If weeds have already gone to seed, they should be carefully removed and burned. Some of the most pernicious intruders have been widely spread through hay or grass used for packing goods—every careful man will never allow such packing material to be scattered over his land either in manure or otherwise. The *second rule* is founded on the principle that *no plant can live any considerable length of time without breathing through its lungs, the leaves.* Hence all perennial rooted plants, that creep and extend beneath the surface, like the Canada thistle and milk-weed, and thus form formidable patches, may be destroyed completely and totally, if the leaves are never allowed to appear above ground. The best and most practicable modes of applying these two rules, must vary with circumstances and with the different plants, and will be separately pointed out when treating of the character and habits of each individual.

Of the 80,000 different species of plants which grow upon the face of the earth, only a few thousand have ever had an opportunity to grow in cultivated fields. Of these few thousands, a very small number have become distinguished for their vigor of growth under neglect, for their tenacity of life, and rapidity of increase. These few have thus become troublesome weeds. Neglected cultivation and careless management have tested them thoroughly for their bad qualities, and have been the means of selecting them from their thousands of harmless associates, and introducing them into the fields of the farmer.

The yearly loss to the farmers of the United States, occasioned by weeds, amounts to many millions of dollars—enough probably to build an Erie or New-York Central Railroad, dig an Erie Canal, or build and endow one hundred first-class agricultural colleges. With many land-owners, one-fourth

part of the corn crops is consumed by pig-weeds, fox-tail, and other intruders, and an equal proportion of meadow and pasture land occupied with mulleins and thistles, johnswort and brier bushes. With others the loss is still greater, while a few good managers lose little or nothing. Admitting it to be but a tenth part as an average, what is the result? The aggregate value of all the crops of the country, is doubtless at least eight hundred million dollars yearly, and but a tenth part of this is *eighty millions*—a sum far exceeding the estimate just offered, and enough to make the two great railroads and the Erie canal combined. The subject is therefore of sufficient magnitude to merit some attention.

The list here described is divided into annual and biennial, which increase mainly by seeds; simple perennial, which multiply mostly in the same way; creeping perennial, which increase not only by seeds, but by the extension of the roots, and noxious and intruding shrubs.

I. Annual and Biennial Weeds.

These weeds increase mostly by *seeds*. Some multiply with a rapidity that is almost incredible—and careless observers are therefore induced to adopt such errors of opinion as spontaneous increase without seed, and transmutation of sown crops to the weeds themselves. As an example of this prolific character, the writer has counted three thousand seed on a single chess plant, when allowed to grow freely on rich soil, without the smothering influence of wheat or other dense crops. Three thousand the first year would be nine million the second, twenty-seven thousand million the third, which would be about thirteen bushels, (counting two million seed to the bushel,) thirty-nine thousand bushels the fourth, one hundred and seventeen million bushels the fifth, three hundred and fifty-one thousand million bushels the sixth—enough probably to seed the whole earth—showing the prodigious multiplication when under favorable circumstances. Some other weeds increase as rapidly. The importance of

Fig. 1—False Flax.

Fig. 2—Cockle or Wheat Cockle.

literally *rooting out* such intruders at their very first appearance—of nipping the evil in the *bud*—is obvious.

Wild Mustard or Charlock, (*Sinapis arvensis.*)—An introduced plant, and being an annual, it is becoming quite troublesome in grain crops sown in the spring. Although each plant dies every year, yet as the seeds retain their vitality a long time, it is difficult to extirpate it after the soil becomes infested. A system of rotation in which spring-sown crops are not frequent, and weeding out by hand as soon as the yellow blossoms show themselves in spring, are the best remedies.

Shepherd's Purse, (*Capsella bursa-pastoris.*)—A well-known annual

weed, frequent in waste places and in neglected gardens, and easily extirpated by good culture.

FALSE FLAX, (*Camelina sativa*,) fig. 1.*—An annual plant, introduced with flax seed, and a common weed in that crop—falsely believed by some superficial observers to be degenerated flax. The remedy is to sow clean seed, and alternate flax with other crops.

COCKLE OR WHEAT COCKLE, (*Agrostemma githago*,) fig. 2, p. 86.—Introduced from Europe in the seed of wheat and rye. It is an annual, but becomes biennial if sown late in the season. The seeds darken the color of flour and injure its quality. To expel it, sow only clean seed, pull up the small plants early in spring, and again any that may have escaped when in flower early in summer. Since the improvement in fanning mills, which separate the seed, the cockle has not been a formidable weed with good farmers.

Fig. 3—CHICKWEED.

CHICKWEED, (*Stellaria media*,) fig. 3.—Although an annual, its extreme hardiness causes it to grow and flower during winter. On damp soils it is often quite troublesome. Underdraining and frequent cultivation will subdue it.

Fig. 4—PURSLANE.

* For most of the cuts which accompany this article, we are indebted to Dr. DARLINGTON'S excellent work on Agricultural Botany, edited by Prof. THURBER, and furnished through the liberality of the publishers, C. M. SAXTON, BARKER & Co. of New-York.

PURSLANE, (*Portulaca oleracea*,) fig. 4.—An annual weed, spreading over the surface, and becoming very troublesome in gardens in summer, on account of its extreme tenacity of life, after the stem is cut off. Removal from the land, or burying, are therefore advisable, after passing the hoe over the surface.

RAG-WEED OR BITTER-WEED, (*Ambrosia trifida*,) fig. 5.—Another species, *A. artemesiæfolia*, is similar, but smaller. Both are annuals, and find their way into cultivated fields, the latter in the stubble, after grain. Clean culture and rotation in crops are the best remedies.

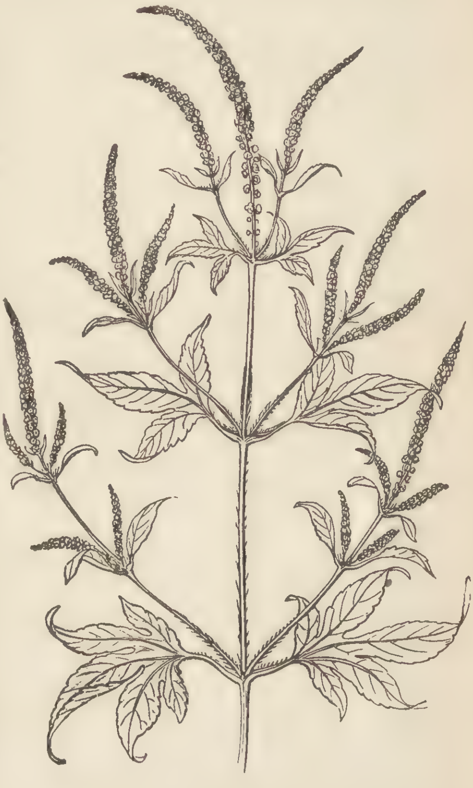


Fig. 5—RAG-WEED OR BITTER-WEED.

CLOT-BUR OR COCKLE-BUR, (*Xanthium strumarium*,) fig. 6.—An annual, not a formidable weed, but frequently quite troublesome — the burs adhering to the fleeces of sheep. It is easily subdued by cultivation. The thorny clot-bur (*X. spinosum*) is a worse plant, and is becoming introduced into the southern portion of the United States, and in the suburbs of cities farther north.

BUR MARIGOLD, STICK-TIGHT, OR SPANISH NEEDLES, (*Bidens frondosa*.)—The seeds of this plant are oblong, and are furnished at one end with two barbed awns, which cause them to adhere when ripe to clothing and the coats of animals, and when numerous the whole surface becomes coated and black with them. It is not a formidable weed, and only accompanies neglected

cultivation. It is strictly an annual. The name *Spanish Needles* more properly belongs to another species, *B. bipinnata.*

Mayweed, (*Maruta Cotula.*)—A well-known annual, usually enduring the winter, growing often abundantly along roadsides, and possessing a disagreeable odor. As it rarely gets much possession of cultivated fields, it is not a great pest.

Wild Chamomile or Large Mayweed, (*Anthemis arvensis.*)—This is nearly allied to the preceding, and by former botanists was placed under the the same generic head. It is distinguished from the Mayweed by its darker green below and more hoary appearance above, by its more aromatic and less offensive odor, its more coarsely cut leaves, and more especially by its far more pernicious character. It is not yet extensively introduced, but in some places has found its way into winter grain fields, and by its dense spreading growth in autumn and spring, sometimes nearly chokes out the young crop. It is very difficult to extirpate after it once obtains large possession; but is best treated by adoptnig a rotation of crops in which winter grain rarely occurs. It is an annual, but generally assumes the character of a biennial, especially in winter grain crops.

Fig. 6—Clot-bur or Cockle-bur.

Thistle or Horse Thistle, (*Cirsium lanceolatum.*) — A coarse rough biennial plant, from two to four feet high, growing abundantly in neglected pastures throughout the northern States. It flourishes in rich soils, and by occupying the ground greatly lessens the crop of grass. It spreads extensively by its seed, which, attached to the pappas or plume, float on the wind through the air. It is easily destroyed by cutting off the root with a stiff hoe, below the surface. If this is done when in blossom, the root will not sprout again.

Burdock, (*Lappa major.*)—Widely known as a coarse, rank, bitter weed,

with large very adhesive burs, which become entangled in the wool of sheep, hair of horses and cattle, and in clothing. Biennial, and easily destroyed with diligence, by cutting off the root a few inches below the surface, although some years are usually required to eradicate them completely. They may be removed from grass ground without destroying the turf, by thrusting down a narrow spade, ground sharp, to cut off the root, and then lifting out the plant and treading the surface. The best time to do this is just as the flower buds form.

Fig. 7—Red Root.

Mullein, (*Verbascum Thapsus.*) — A widely known biennial weed, common in the pastures of slovenly farmers, along the borders of roads, &c. It sends up the second year a single tall stem, which bears many minute seed, and when ripe these are scattered abundantly on the ground and carried in the hair of domestic animals. The plants are easily destroyed by cutting off with a hoe, or by pulling them up the second year when the soil is softened by heavy rains.

Red Root, Pigeon weed, Gromwell, Stone weed or Stein-kraut, the latter corrupted into "*stink root*," (*Lithospermum arvense*,) fig. 7. This is one of the worst weeds with which the farmer has to contend; and although an annual, assuming the character of a biennial, and spreading only by seed, it is far more difficult to eradicate than the Canada thistle. As one of its names indicates, the root is red; the whole plant somewhat rough and hairy, (very rough when dead and dry,) from 8 to 12 inches high, more or less branched, leaves narrow and about an inch long, flowers small, nearly white, seeds hard or stone-like,

whence another name, stein-kraut or stone weed, and the generic name *Lithospermum.* These seeds are remarkable for retaining their vitality for years when deeply buried, or if warmth, air and moisture are withdrawn. It is this quality which renders the plant so difficult to eradicate from the soil. The seeds may be deeply buried by plowing, and remain dormant while successive crops of grain are taken from the land by shallower cultivation, until deep plowing again brings them to the surface. During this interval the farmer may have supposed his soil free from the pest, to be disappointed when brought up to air and moisture. It is the great enemy of the wheat crop; and when it has once taken possession of the field, it will nearly run out the grain.

Some farmers, by taking it early, or before it has spread much in their fields, have succeeded in keeping this weed in small numbers or wholly eradicating it, by weeding it annually from their wheat by hand, going over the fields two or three times in spring, and making a regular job of it like any other yearly work. One farmer found it necessary to expend forty days labor the first year in this way, but in a few years the weed became so reduced that three or four days were found sufficient, and no doubt a continuation of this care would clear out the last plant. Where, however, it has taken extensive possession, a more rapid and wholesale process must be adopted, at least for a time. A good one is the following: For the first wheat crop, plow the ground very deep, at least eight inches, for which purpose a double Michigan plow will answer well. This will throw the seed down beyond the reach of vegetating, and the wheat may be sown on the inverted surface and escape for one year. It will be perceived that success in this instance depends entirely on a *single* plowing; if this does not reduce the soil to a proper condition for sowing, the process should be completed by means of a two-horse cultivator or gang plow. All the red root which appears should be pulled out from the wheat in spring by hand. In the fall, plow as deep as for the wheat, which will throw the seed again to the surface. Harrow well, and the seed will germinate. The next spring, turn the weeds under with a gang plow, or cut them to pieces with a large steel-tooth cultivator, and sow oats, barley, spring wheat, or peas—the latter is best in the way of rotation. Plow and harrow again in fall, to start another crop of weeds, and plant corn, cultivating it thoroughly. The following year the land may be seeded to clover or grass; and when wheat is again introduced in the rotation, but few weeds will be found, which may be pulled out by hand. It is important that no seed should be returned to the soil through manure; and hence it may be best, when the straw contains much, to burn it in the field in a compact heap. The seed is sometimes spread to other farms by throwing the plants into the road, when in muddy weather they adhere to the soil on wagon wheels, and are carried to a distance.

Tory Weed or Hound's Tongue, (*Cynoglossum officinale*,) fig. 8.—A coarse plant growing along roadsides, about two feet high, bearing purple-red

flowers, and flat seed roughened all over with short barbed or hooked prickles, causing them to adhere to clothing and to the hair and wool of animals. It is biennial, and is destroyed in the same way as the burdock, mullein, &c.

Fig. 8—Tory Weed or Hound's Tongue.

Jamestown Weed or Stink Weed, (*Datura stramonium.*)—A coarse fœtid plant, growing on roadsides and waste places, often several feet high. The leaves are large, the flowers tubular, nearly three inches long, and the seed vessels an inch and a-half long, and covered with coarse fleshy prickles. It is an annual, and is easily destroyed.

Lambs' Quarters. Goose-foot or Pig Weed, (*Chenopodium album.*)—An annual weed, often growing abundantly in gardens and other cultivated grounds; the stem often growing three or four feet high, angular or grooved, often with some purple stripes; leaves with a mealy appearance; flowers small, numerous, green; seeds small and numerous, and the plants are thus rapidly increased where neglected cultivation prevails. The remedy is very simple—destroy all the plants with the plow, hoe or cultivator, before they attain more than an inch or two in height. The labor will be small at this time, compared with that required after they are a foot high; and none can go to seed.

Green Amaranth, sometimes called *Pig Weed*, (*Amaranthus hybridus*,) fig. 9.—A coarse annual weed, with a green branching stem; flowers small, green, packed into close spikes, with bristle-like hairs among them. It finds its way into cultivated grounds like the preceding, and is to be similarly

treated. The seed are quite small, black and shining, and very numerous. There are several species or varieties, not very distinctly defined.

WILD TEASEL, (*Dipsacus sylvestris.*)—Common along roadsides and waste grounds. It is biennial, and is easily destroyed by mowing the second year, before the seed are formed.

CHESS, CHEAT, OR BROOM GRASS, (*Bromus secalinus,*) figs. 10 and 11.—One of the most troublesome weeds which infest the wheat fields of this country. The panicle is branching and spreading, and bears numerous spikelets, like the enlarged one in fig. 10. This weed was formerly supposed by some to be produced from degenerated wheat; but the fact that it belongs to quite a distinct genus from wheat, renders this impossible. The following are the principal causes for the adoption of this remarkable notion:

1. The seed of the chess plant are much smaller than those of wheat, and may be numerously scattered through seed wheat, and reproduce the weed among the stubble, unperceived to ordinary observation.

2. The seed being very hardy, may remain

Fig. 9—GREEN AMARANTH.

at some depth in the soil, unperceived, and dormant until brought near the surface, and subjected to the action of light, air and moisture. A bushel of chess contains over one million seeds; yet a bushel is only one twenty thousandth part of the soil on an acre of ordinary depth; hence there may be a million chess seeds through the soil, and yet, constituting but a twenty thousandth part of its bulk, be wholly imperceptible to observation.

3. When the young chess plants, growing from this seed, are shaded by a dense crop of wheat, they grow only a few inches high, sometimes not over two inches, (as at *c*, fig. 11,) perfect their seed, and are wholly unobserved; but when the wheat is winter-killed, or otherwise destroyed, they spread and grow upwards unchecked, three feet high, (as at *a*,) and often produce from two to three thousand seed to a single root, cover the whole surface, and lead to the superficial conclusion that the wheat, being killed, was converted to chess.

Fig. 10—Chess.

Fig. 11—Chess, Cheat, or Broom Grass.

Those who advocate this notion of transmutation, have claimed that among the countless millions of plants which change every year from wheat to chess, many might be caught in the act, furnishing a head of wheat and a head of chess from the same root. The writer, having often heard of such curiosities, but never finding any, offered a reward of *five hundred dollars*, a year or two since, which offer he published in the *Country Gentleman*, and kept it standing for several months. But no double plant was presented. From the value of the prize, offered during a pecuniary pressure, the conclusion was adopted that no such plant existed.

The process for the eradication of this weed is simple—namely, sow none but perfectly clean seed, and it will gradually disappear from the land. Many thorough farmers have adopted this mode, and have completely extirpated it

from their farms. The improved modern fan-mills (of which Nutting's is best,) have greatly facilitated this object, and chess has become a less formidable weed than formerly.

Foxtail Grass, (*Setaria*,) fig. 12.—There are two species which are often abundant in cornfields, and spread rapidly by seed. The common Foxtail, (*Setaria glauca*,) has a tawny, bristly, cylindrical spike; and the other (*Setaria viridis*,) a larger and green spike. They are easily destroyed when they first appear above the surface; and being never allowed to go to seed, soon disappear.

II. Simple Perennial Weeds.

Tall Crowfoot or Butter-cup, (*Ranunculus acris*, acrid Ranunculus.)—An introduced weed, common in meadows and pastures in many parts of the Northern States. It is not a formidable weed. It is easily eradicated by good cultivation in connection with rotation of crops.

John's-wort, (*Hypericum perforatum*, or perforated Hypericum,) figure 13.—A well-known and very troublesome perennial weed, and often occupying neglected pastures to such an extent as to greatly diminish or exclude the grass crop. Good cultivation and rotation will extirpate it. Sheep eat it when it is young and tender, and thus tend to keep it down—but sweet grass and clover are much better food for these animals, and they should not thus be compelled to suffer from the bad husbandry of their owners. Dr. Darlington remarks, in alluding to the

Fig. 12—Foxtail Grass.

Fig. 13—John's-wort.

fact that it was named "St. John's-wort," from its supposed power of keeping off evil spirits on St. John's night, that "the custom is still followed in the retired part of the Pyrenees, of hanging garlands of the herb over the doors, to preserve the inmates of the house from 'storms, thunder, heretics, and other evil spirits.'"

Plantain.—There are two common species of the plantain, known as the *Plantago major*, or broad-leaved, and *P. lanceolata*, or narrow or lance-leaved. Neither of them are formidable weeds, although somewhat troublesome. The broad-leaved is common along foot-paths and in door-yards, and is sometimes called by the aborigines, "the white man's foot." The lance-leaved spreads more extensively, often prevailing to a considerable extent in pastures. Both are perennial-rooted, and they may be destroyed in a small way by cutting off the root beneath the surface, and on a larger scale by rotation of crops and thorough culture. The seeds being about the size of red clover seed, are often sown with the latter. In some places the narrow-leaved is tolerated as a forage plant—and although not a decided pest, farmers would be better without it.

Poke or Pokeweed, (*Phytolacca decandra.*)—Well known by its rank, fleshy and succulent growth, and by the abundant purple juice of its berries. The root is perennial, and easily destroyed by cutting off with a stiff hoe below the surface.

Water Hemlock, (*Cicuta maculata*, or spotted Cicuta.)—The stem and leaves, and the root more especially, are deadly poison. The aromatic quality of the plant sometimes induces children and others to eat it, endangering or destroying their lives; and it is also sometimes fatal to cattle. Hence it should be carefully extirpated. The stem is spotted with purple or marked

Fig. 14—Poison Hemlock.

with short streaks. The root is perennial. Perhaps the most dangerously poisonous plant known.

Poison Hemlock, (*Conium maculatum*, or spotted Conium,) fig. 14.—This plant somewhat resembles the preceding, but is a thicker and ranker grower, and has a disagreeable odor. It grows abundantly in some places

along roadsides. The root is perennial. It is easily destroyed by mowing just before seeding, and by cutting up the roots

Ox-eye Daisy, or White Daisy, (*Leucanthemum vulgare*,) fig. 15.—A perennial-rooted weed, and one of the worst the farmer has to contend with, on account of its extensive spreading, and the great difficulty of its extirpation. The seed are very tenacious of life, and will vegetate after passing through the stomach of an animal. The wide foothold it has obtained is of course the result of slovenly farming, and is most conspicuous in pasture fields, whitening the whole surface when in flower. Various means have been devised for destroying it. Attempts have been made to turn it to account by compelling animals to eat it. Sheep may be made to feed on it by depriving them of all other food, especially early in the season while the young plants are tender and less bitter than afterwards; but it is bad economy, and they cannot thrive when driven by starvation to eat unpalatable food. A correspondent of *The Cultivator* says that a large farmer succeeded in killing most of the daisies on a sixteen-acre lot, by turning in five hundred sheep a week at a time—but it was a very expensive experiment, for the sheep became extremely poor, and he regarded his loss at one thousand dollars. Thorough cultivation is the best remedy, and may be given as follows: Plow the sod thoroughly, plant corn, hoe and cultivate well once a week. Next year sow and plow in two crops of buckwheat, and the third year manure and plant corn again; then again two crops of buckwheat for two years more, when the daisies will have vanished and the land be left rich.

Fig. 15—Ox-eye Daisy.

This weed grows best usually in poor pastures, where there is not enough fertility to cause the growth of interfering plants. On rich ground, tall and dense grass will soon overtop and partly smother the weeds.

Fig. 16—MALLOW.

MALLOW, (*Malva rotundifolia*,) fig. 16. —Well known by its round leaves, prostrate stem, and its circular fruit. It is somewhat troublesome in gardens, but is not a formidable weed.

SOUR DOCK, or Curled Dock, (*Rumex crispus.*)—Well known by its long narrow leaves with curled margins, and its numerous, brown, triangular seed. It is a perennial, and is easily eradicated by a moderate amount of labor in pulling up the roots before the seeds form, while the ground is soft from recent rains; or if too hard, they are cut off by a sharp narrow tool. There is another species. (*R. obtusifolius*,) with broader, rounded leaves, which is to be treated in the same way.

SORREL OR SHEEP SORREL, (*Rumex acetosella.*)—This plant is quite similar in its character to the sour dock, but much smaller in every respect. It grows from six inches to a foot high, with a slender, branching, and angular stem, the whole plant of a strong and rather agreeable acid—and when in large quantities giving a peculiar reddish appearance to the field. It usually grows most abundantly on sandy soils, more particularly those of a rather dry and sterile character, but often on richer loams. In the former case, lime or ashes, or both, have tended to expel it; and in the latter, thorough culture. Neglected and superficial cultivation is to be avoided in all cases; and seeding down very densely with clover and a small portion of timothy, tends to drive it out. On the exhausted lands of Virginia, dressings of lime and marl have destroyed it thoroughly—in other regions, these applications alone have produced little effect, and the use of the plow, cultivator and hoe have become indispensable.

GARLIC, Field Garlic or Wild Garlic, (*Allium vineale.*)—Nearly allied to the onion, and growing in many places extensively in meadows and pastures. It imparts a strong and disagreeable odor to the milk and butter of cows which feed on it. It is subdued by a rotation of crops with thorough culture.

NETTLE, (*Urtica dioica,*) fig. 17.—A rough upright plant, growing along fences and in waste places, armed with stinging hairs, which produce an intolerable itching in the skin for a short time after application. Darlington quotes Culpepper as remarking, in allusion to this quality, "that they may be found by *feeling* on the darkest night." The root is perennial, and the plant easily destroyed by cultivation. There is a smaller species, (an annual,) which, like this, was introduced from Europe, and a native species, with broader leaves, growing in moist places and along the borders of streams, all of which have similar properties; but the first only is much known as a weed.

Fig. 17—NETTLE.

SWEET FLAG OR CALAMUS, (*Acorus calamus.*)—Known by its strong aromatic character and odor, by its dense mass of creeping roots, and by the yellowish-green spadix or fleshy spike of flowers at the middle of the leaf-like stalk (or scape) which supports it. It often obtains possession of wet or swampy lands to the exclusion of everything else. To eradicate it, first drain the land, and then repeatedly plow with a steel mouldboard, and harrow, for two seasons. Where the land cannot be drained, the mass of plants may be cut into blocks with sharp spades, and thrown into heaps. When dry, remove these blocks of roots, and convert them to compost in layers with stable manure. Seed the cleaned land with red-top, or timothy if dry enough. The small fibrous roots which run downwards from the large creeping ones, are easily cut off with a spade or sharp plow, and will not grow. In any case, where the plow may be used for cutting up the mass, it would be well to pile up; and when dry to cart off the pieces and convert them to compost.

CAT-TAIL FLAG or Cooper's Reed, (*Typha latifolia.*)—Conspicuous for its long leaves and large cylindrical spike, growing in swampy places. Underdrain the land, or cart on earth, or both—and then seed with red-top; or, if well drained, with timothy.

III. Creeping Perennial Weeds.

Canada Thistle, (*Cirsium arvense*,) fig. 18.—This is a formidable weed in two respects. Like the preceding it spreads extensively by seed, and the roots being both perennial and creeping, the plants quickly extend into patches beneath the surface. The roots have been sometimes found several feet below, in porous subsoils; and as the fragments of roots are sufficient to produce new plants, it was formerly supposed to be incapable of eradication, without digging out every portion—which, in a large patch, would involve immense labor. This opinion has now been found to be fallacious, and by the observance of a simple principle, the whole subterranean net-work of roots may be easily destroyed. *The roots cannot live, unless they breathe through their lungs, the leaves.* Keep the portion of the plants above ground from growing, and the whole patch may be destroyed in a single year. This may be accomplished in several ways. Small patches may be smothered by covering with boards, closing the joints with a second layer, to prevent a single plant from finding its way through. Sawdust, tan, or straw, will accomplish the same end, if laid on thick enough. If a single plant, however, escapes, it will sustain life in a portion of the roots. Another way is to cut the plants off daily even with the surface of the ground, so that a single leaf cannot grow. The best way for common practice is to plow them under, and continue the plowing often enough to keep them smothered. If well and deeply done, once a

Fig. 18—Canada Thistle.

month will answer the purpose. This mode succeeds best on heavy or clayey soils, which do not permit the thistles to find their way readily upwards. But even on such soils, the work must be very carefully performed, for if a portion of the weeds are but partly covered, they cannot be destroyed. On gravelly and other porous soils, it is more difficult to destroy them by plowing. The operation must therefore be more frequent on such soils, and greater care taken to do it deeply and in the most thorough manner. The Double Michigan plow will be found to answer an excellent purpose on these as well as all other kinds of soil.

Toad Flax or Snap Dragon, sometimes called "Butter and Eggs" from the color, (*Linaria vulgaris*,) fig. 19.—An exceedingly troublesome and pernicious weed, extending now through the Northern and Middle States. The root is perennial and creeping; the whole plant very smooth; the flowers somewhat in the form of lips, the outer part pale yellow, the palate tinged with orange, and each flower furnished with a horn or spur half an inch long. It grows one or two feet high and quite erect. It is common in many places along roadsides, fences, and in pastures. Cattle will not eat it, nor the grass it grows with. Spreading in dense patches, it soon prevents the growth of other plants. It is difficult to eradicate—the best mode is repeated plowing and harrowing.

Fig. 19—Toad Flax.

Horse Nettle, (*Solanum carolinianum.*)—A troublesome weed at the South, and extending northward. It has broad leaves, and a stem a foot or more in height; nearly the whole plant is covered with sharp spreading prickles. It has flowers of a bluish-white, and orange-yellow berries one-fourth or one-third of an inch in diameter. It is exceedingly tenacious of life, extends by the roots in patches, and nearly monopolizes the soil when it once obtains possession. Farmers in the Middle States should keep an eye to it, and destroy it on its first appearance.

Milk-weed or Silk-weed, (*Asclepias Cornuti.*)—Well known by the milky juice which flows out when the plant is cut or broken. It extends rapidly by its long, fleshy, perennial, branching roots, and by its flat seeds, which are wafted to great distances by means of the copious silky hairs attached to them. The stem grows two or three feet high; the flowers are numerous, in umbels, and greenish purple; the seed vessel is a folicle, opening by a longitudinal slit, the seed imbricated or placed like shingles on a roof, on an oblong fleshy center.

The milk-weed becomes troublesome on account of its running roots. Like the Canada thistle it may be destroyed by never allowing the roots to breathe

through leaves. On a moderate scale, this may be done by repeatedly pulling out the young plants the moment they appear above ground; or on a larger scale by deep and repeated plowings, followed by hand-pulling. An easier mode has been attempted, namely, starving sheep down to eating the weed, but the injury to the flock by this hard usage has been ten times greater than the cost of extirpating by hand labor.

COUCH GRASS, QUITCH GRASS OR QUACK GRASS, (*Triticum repens*,)fig. 20.—This grass, in consequence of the great tenacity of life in its creeping roots, is extremely difficult to destroy, and is one of the most troublesome and obstinate weeds in the Northern States. When it has taken full possession, the roots form a dense stratum several inches in thickness, which is plowed up in thick stiff masses which cannot be pulverized. The best mode of eradication, is to select a time when the weather and soil are in the dryest state, and plow, harrow, and rake the roots into heaps, with a spring-toothed or other horse-rake, and when dry to burn them. Repeat the operation till all are extirpated. Or the roots may be fermented and killed in layers with manure, forming compost. As every fragment of the roots will vegetate in

Fig. 20—COUCH GRASS, QUITCH GRASS OR QUACK GRASS.

moist soil, harrowing will only extend the evil in such soils. E. Marks of Onondaga Co., N. Y., states in a former number of *The Cultivator*, that he destroyed this grass in one season by *smothering*—plowing it under seven times during the season, each successive plowing being a little deeper until ten inches was attained.

IV. Shrubs.

Poison Sumach and Poison Vine, (*Rhus Toxicodendron*,) fig. 21.—The "Poison Vine," formerly known as the *Rhus radicans* of botanists, is now ascertained to be only a running variety of the *R. Toxicodendron*, which grows in the form of a small bush. Some persons are poisoned by it, or even by coming near it, and blisters are formed on the skin; others are wholly

Fig. 21—Poison Sumach.

unaffected. There is another species, less common, but still more poisonous, the *Rhus venenata*, distinguished by its pinnate or elder-form leaves, while the Toxicodendron has ternate leaves or in threes. They sometimes obtain a foothold in waste ground and along fences, and should be carefully destroyed by cutting up as fast as they appear. The common sumach is another species of Rhus, but not poisonous to the touch.

Blackberry or Wild Blackberry, (*Rubus villosus.*)—This well-known

shrub often takes possession of waste ground on the land of slovenly farmers, or on newly cleared fields. Early in the season, when the leaves and shoots are tender, sheep will eat and reduce them, especially if strewed with salt; and mowing them near the ground towards the close of summer, checks their vigor. Plowing and planting with hoed crops enables the farmer to eradicate them; but an easier and perhaps as efficient a mode is to sow to buckwheat, or better still to corn fodder in thick drills, cultivating two or three times.

ELDERBUSH, (*Sambucus canadensis.*)—A somewhat troublesome bush along fences, and a conspicuous indication of slipshod farming. The remedy recommended for blackberry bushes will destroy it. If the bushes are cut early in summer, and the brush burned upon the stubs, and then all the sprouts pulled up the moment they appear, the roots will soon perish. Some attempt to root them out by digging down deeply for the roots; it is much easier to starve the roots to death by allowing no leaves to grow above ground.

ALDER, (*Alnus serrulata.*)—This well-known shrub, from 3 to 10 feet high, grows along the margins of streams and in swamps, needlessly occupying the ground. If cut closely during the last half of summer, for two or three seasons, they are destroyed.

There are other plants, both native and introduced, more or less troublesome as weeds, which might have been added to this list. But being either quite local, or less formidable in their character than most of the preceding, it is deemed hardly necessary to describe them separately, as they are all alike subject to the same general rules for extirpation, namely, to prevent seeding, to destroy very young if annuals, or before seeding if perennials, to smother if creeping by the roots, and to adopt a rotation for most that shall require clean and thorough cultivation.

A disagreeable object to every farmer who has any appreciation of the neat or beautiful, or a dislike to slovenly practices, is the common throng of weeds along roadsides. There are some land-owners who are careful to keep their fields comparatively clean, who throw all kinds of rubbish into the highways, along the borders of which immediately spring up thistles, mulleins, burdocks, mayweed, nettles, clot-bur and briers, rendering the public thoroughfare, which should present an agreeable picture to every one, a disgusting and repulsive object to the eye. But unfortunately the evil does not end here; these weeds being entirely neglected, furnish a most abundant seeding to the neighboring farms, and the weeds thus introduced are not easily eradicated.

PROFITS OF FARMING.—J. W. Proctor of Danvers, Mass., at a late agricultural meeting at Boston, said there were thirty neighbors of his, who had on an average not over 20 acres of land each, who cleared above all expenses, from $300 to $500 a year. They cultivate their fields like gardens, use plenty of manure, and plow ten inches deep.

FILTERS AND FILTERING CISTERNS.

MANY inquiries having been recently made for the best mode of constructing filters, we are induced to give a few of the many modes which have been adopted, either of which will answer a good purpose, and which are adapted to various circumstances or requirements. The importance of purifying thoroughly the water which is used as a drink, is scarcely appreciated. There is no doubt that thousands of cases of severe illness might be prevented by the general use of pure water.

All the different modifications of filters have one similar and essential provision, namely, the passage of the water through layers of coarse clean sand or fine gravel, and charcoal. The gravel and sand are for the purpose of keeping the bed loose and for retaining the coarser impurities; and the charcoal, with its powerful absorbent powers, takes out such foul matter as may be held in solution, and which no merely mechanical straining could intercept. In some filters the sand or fine gravel is mixed with the charcoal, and slightly moistened to make it pack well; in others they are placed in alternating layers of about two inches, and separated from each other by a single piece of cotton flannel. We do not know that one mode is better than the other; but it is well in either case to use the flannel to prevent the displacement of the materials, and to keep the charcoal from being washed out of place. The sand used should be both coarse and clean—good beach sand answers an excellent purpose. The charcoal should not be pulverized, but granulated, so as to be about the size of peas or coarse shot. It is said that the refuse accumulations in the pipes of locomotives, which are usually thrown out at engine houses, are just the material for this purpose.

Filters are either portable, and used for purifying a few pails of water at a time; or else fixed and attached to the cistern, to cleanse all that passes into it. The simplest portable form is represented by fig. 1. It consists of a barrel or tub, with a stop-cock to set within a few inches of the bottom, for the escape of the purified water. On the bottom is laid clean stone about the size of hens' eggs or the fist. These may occupy about one-fourth of the barrel, and are to form a reservoir for the water after it is cleansed. The

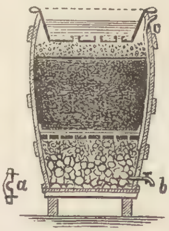


Fig. 1.

stop-cock should be an inch or two above the bottom, so that any possible sediment may not be drawn off. The filter may be raised a little on bricks or wooden blocks, to set a pail under the stop-cock. On the top of this layer

of stones are placed smaller stones, and then again smaller still, and the surface smoothed off, about one-third of the way up, and the whole covered with a perforated board. Cover the whole of this board with a piece of flannel, which should extend up an inch or two against the sides of the barrel. On this place the mixture of sand and charcoal, already described, packing it compactly but not pounding it, until within six inches of the top, and cover it with a layer of coarse gravel. Provide a large tin pan, to set in and fit the top of the barrel. Solder a few short tubes in the bottom of this pan, extending upwards an inch from its bottom, and thrust a piece of sponge into each tube. These serve to strain the water as it passes through into the filter, and coarse sediment will settle on the bottom of the pan without choking these tubes. The pan may be lifted and washed out once a week, more or less, as sediment accumulates in it, and the sponges are easily withdrawn and cleansed. The capacity of the reservoir at the bottom, may be varied with the size of the barrel, and with the quantity of water required at a time; and the thickness of the layer of sand and charcoal will be indicated by the impurity of the water to be filtered. A small lead tube *c*, should extend from the top of the barrel down its inner side to the reservoir, to admit air, as the water is drawn off—otherwise it will not flow through the stop-cock freely when a supply is wanted. This tube is most conveniently secured to the side of the barrel by means of small pieces of wood, screwed on, with a notch cut in for the tube to pass, as shown at *a*. It may pass through the barrel an inch from the top, which will secure the upper end and place it out of the way.

The wood of the barrel, and the stones, may at first impart an unpleasant flavor to the water, but it will soon pass away. The taste of pine is removed by alcali. The water may be dark colored for a day or two from the charcoal.

A more perfect but more complex filter is shown in fig. 2. A barrel is used as in the one just described; but instead of a reservoir made by filling in a portion with stone, an inverted earthen pot is employed, standing on a layer of gravel, and resting immediately on a perforated board, or what is better, a flat plate of earthenware, full of holes. The outside of this earthen pot, and some inches above it, (varying with the impurity of the water,) is packed with the mixture of sand and charcoal, and the whole covered with gravel, and the water supplied through a pan, as in fig. 1. The top of the inverted pot should be covered with a round piece of tin plate, so as to extend a little beyond it all around, to turn off the descending water like the eaves of a roof, and to prevent its forming channels down the sides of the pot. A small hole is drilled near the bottom of the pot, into which a lead

Fig. 2.

tube is set, with a stop-cock, for drawing off the water; and another tube for admitting air into the reservoir, to supply the place of the drawn water, enters another hole beside it, and passes upwards to the top of the barrel, as in fig. 1. This tube might enter the pot at the top, but would be in the way in packing in the charcoal and sand.* It must curve upwards within the pot, so as to reach the top of the latter, in order that the air may escape as the reservoir fills with the filtered water. An instance occurred in which the filter, from some unknown cause, suddenly ceased to operate; on examination this tube was found to be stopped, and on removing the obstruction, the water flowed freely. Any common stone or earthen pot inverted will answer in making the reservoir of this filter. Instead of a perforated board, a round tin plate, punched with holes, would be better.

Filters attached to the cistern in such a way that all the water that passes into it is purified, have a great advantage over those that are portable, in the large quantity of pure water always at hand, without the labor of first passing it through the portable filter. Fig. 3 represents one of the sort, which possesses several advantages over most others for this purpose. Two circular cisterns are first built of stone or hard-burned brick in water lime, placed so near each other that at the nearest point there is only the thickness of the wall. In this wall is laid a lead tube, about one-third the way up from the bottom of the smaller or receiving cistern, and projecting a few inches beyond the wall.

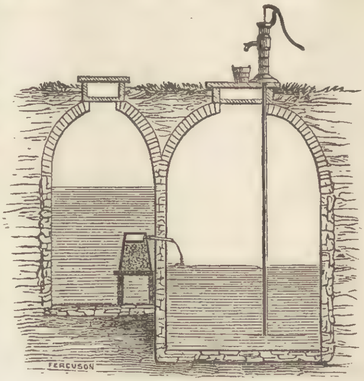


Fig. 3.

The rain water from the roof pours into the smaller cistern, and would pass through this short tube into the larger cistern or main reservoir. In connection with this tube the filtering vessel is placed. It consists of a largest size stone butter pot. It rests, inverted, on four brick legs, on the top of which a board, full of holes, is placed, to support the materials within the pot. A hole is made near the upper side of the pot to receive the end of the lead tube, which is made to fit the hole water tight, by packing. When the rain water falls into the smaller cistern, it rises through this inverted pot, and is thus cleansed, and runs into the larger one. If the pot is properly filled, all the rain water which fills the larger cistern will be as clear and pure

* It may be best, on the whole, to pass the air pipe into the TOP of the inverted pot, as the water may get into the bent part when made as shown in the figure, if too much is poured in at a time, and make trouble.

as a crystal spring. To fill the pot with the sand and gravel, set it down in its common position, or with the open end up; fill in first coarse gravel; then place over this a layer of cotton flannel—the successive layers of coarse, clean sand and granulated charcoal, as already described, or the ingredients in mixture. Cover the top with the perforated board, set it on the brick legs, pack the lead tube tight, and the filter is ready for operation. As the water enters the pot upwards, all the sediment will fall to the bottom of the cistern, and will not choke the filter; and the pot may be removed and replenished as often as circumstances require. The water will flow through it as long as the level of the water in the smaller cistern is higher than that in the larger. If at any time it is found to flow too fast for complete purification, it may be partly stopped or plugged, so as to run slowly. A stop-cock attached to it on the side of the larger cistern, worked with a wire from above, might be a convenience. The smaller or first cistern should be large enough to receive all the water which falls in a single shower, which may be easily estimated by remembering that every inch of rain that falls upon a roof, (and few showers exceed one inch,) yields two barrels for each space ten feet square.

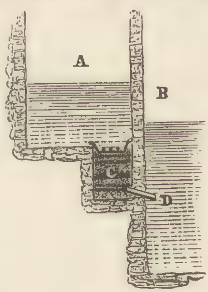


Fig. 4.

Another excellent form is shown in fig. 4, A being the smaller or receiving cistern, B the larger reservoir, C the filter, and D the discharging pipe. It has the same pan to hold the sediment as in figs. 1 and 2, with sponge orifices. The sediment settles in this pan, and is easily removed. It is more difficult to pack and remove the gravel, sand and charcoal, than in fig. 3, where the filtering mixture may be taken out, turned over, and washed. It has the advantage, however, of being more solid and compact, and also in operating with a small quantity of water; in fig. 3, the receiving cistern must be one-third filled. On the whole, the latter is perhaps the best.

Sometimes a common cistern is separated into two parts for filtering, by means of a straight wall partition. But unless the cistern is small, or the wall quite thick, there will be danger of its bursting by the unequal pressure when one is much fuller than the other.

Bruising Oats for Horses.—The fact that oats are frequently undigested, and pass through the horse without change, should be sufficient to show the importance of bruising—for certainly no benefit can be derived from that which is undigested by the animal. Experiments made by the London Omnibus Company and others, show that a smaller quantity is required to produce the same ability to work, when the oats are bruised, than when fed whole.

AGRICULTURAL IMPLEMENTS, &c.

The Universal Plow.

This plow is so constructed that the mouldboard is easily removed when desired, and one of a different form, as the case may require readily substituted, without at all interfering with the other parts of the plow. Instead,

Fig. 1—Frame-work of Plow, with Mouldboard detached.

therefore, of purchasing and using a number of plows, for the various purposes which every farmer requires, he may by means of the Universal plow,

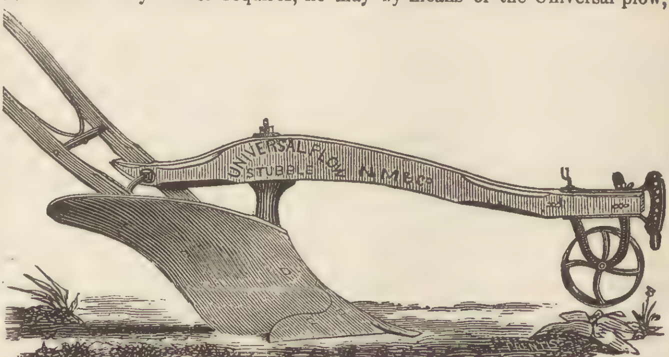


Fig. 2—Universal Plow, Rigged with Stubble Mouldboard.

combine these several sorts in one, with a great saving of expense. Fig. 1 represents this plow with the mouldboard removed, showing the manner in

Fig. 3—UNIVERSAL PLOW RIGGED WITH STUBBLE MOULDBOARD AND SKIM PLOW FORWARD.

which it is fastened to the frame-work; fig. 2 is the same with one of the many formed mouldboards (namely, for stubble,) attached; and fig. 3 is the same with another mouldboard and a forward or skim plow added, transforming it into a Double Michigan or sod-and-subsoil plow. There are many other forms, to meet the various wants dependent on a difference of soil, and changing circumstances. Having used this plow to some extent, it has been found all that is claimed for it, in the way of a ready change from one form to another, and it will undoubtedly become, when further perfected, a valuable and popular implement with all cultivators who require a variety of sorts for the different purposes of cultivation. It is manufactured at Worcester and Boston, and has been brought to its present state of improvement through the experiments of F. Holbrook, Esq., of Vermont.

Improved Plow Clevis.

The clevis, as every plowman is aware, is indispensable to the control of the width of the slice and depth of the furrow. The common or old-fashioned

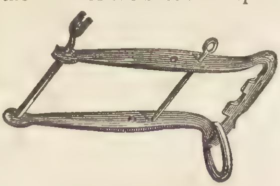


Fig. 4—COMMON CLEVIS.

Fig. 5—THE SCOTCH CLEVIS.

clevis is shown in fig. 4; it is made of wrought iron, and usually answers a good purpose, the ring being placed in the different notches for varying the depth, and the central pin changed to the right or left for controlling the

width of the slice. The ring not being confined, is however often displaced —the beam is weakened by several holes that must be bored through the forward end to admit of changing the central pin; and the clevis itself being more or less loose, the working of the plow is not so accurate as would be desirable. The *Scotch clevis* (fig. 5) is made of malleable cast iron, and is an improvement. The draught-ring, being attached to the forward part by means of a bolt, retains its place; and the rear portion being furnished with an arc of holes, obviates cutting several holes through the beam; or if cut,

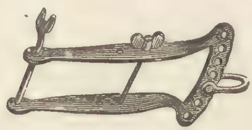


Fig. 6—Half Scotch Clevis.

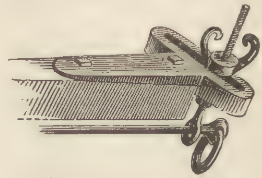


Fig. 7—Quadrant Clevis.

they give a wider range to the clevis. Fig. 6 is the *Half Scotch clevis*, and has the former but not the latter improvement. The *Quadrant clevis* (fig. 7,) is used in connection with a draught rod, and is attached to subsoil and other plows where great strength of draught is employed. The slot admits the change of the rod to the right or left; and the screw enables the workman to raise or lower it to any desired depth. The *Dial clevis* (fig. 8, *a*, *b*, *c*, *d*,) is quite different from the others, and is capable of a very wide range of variation. The two figures *c* and *d*, are representations of the same thing seen in different positions. It is the circular plate or dial, which is attached to the end of the beam, by thrusting the latter into the square hole,

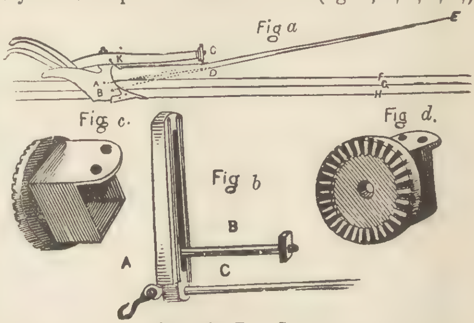


Fig. 8—The Dial Clevis.

(fig. *c*,) so that the dial forms a cap on the end. It is confined to its place by means of the bolt B, (fig. *b*,) passing through the hole seen in the center. Fig. *b* is the guide, the ribs on which fit the teeth or cogs of the dial; and which may be secured at different heights, or at any desired point to the right or left—thus giving a great variation to the running of the plow. C is the draught rod, passing through this guide, and furnished with a draught-hook for attaching the team. The whole, attached to the beam, is shown in fig. 9.

Plow Wheels.

The use of the wheel attached to the plow, gives the furrow a more uniform depth, the draught being so regulated that the slight pressure on the wheel shall keep the forward end of the beam at all times at the same height above the surface of the ground. It is more particularly useful in plowing sod. Fig. 9 shows the more common way of attaching the wheel to the beam, being placed on the left side, so that it may run on the unturned sod. The curved piece of iron, which carries the wheel, rises and falls through

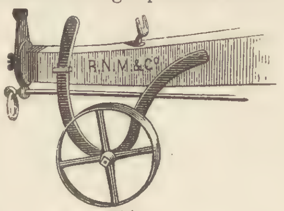


Fig. 9.

the screw staple, as the depth of the furrow requires—its rear end moving on the pin or center. A more firm and secure mode of placing the wheel

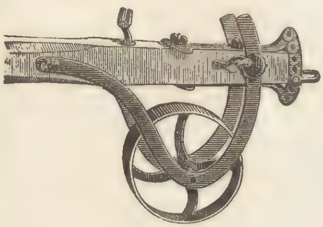


Fig. 10.

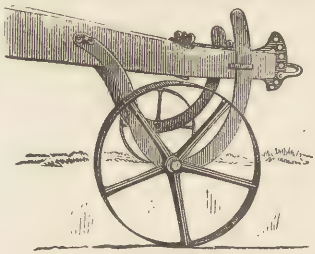


Fig. 11.

is exhibited by fig. 10; and still another, but rarely used or required, is shown by fig. 11, one wheel running on the unplowed land, and the other in the previous furrow.

Nutting's Fanning and Assorting Machine.

This is a remarkable invention, and is a great advancement on all the old fanning mills. Its most distinguishing feature is the character of the *screens.* They have almost the smoothness of glass, and are made by pressing common wire screens, rendering the meshes immovable and always accurate, increasing their durability, giving them the character of glazed muslin, and allowing the seed to slide over them, when slightly inclined from a level. The latter quality gives them their pre-eminent advantage. The seed never falls directly upon them, but first upon a smooth surface, flat with the screen, in passing over which and to the screen, every oblong grain has assumed a horizontal position. If *longer* than the meshes, it goes over them; if shorter, it drops through. Such a mixture, therefore, as spring wheat and oats, often so troublesome to the farmer, is perfectly separated. Even barley and spring wheat are separated, the barley grains being slightly longer, and enough lighter to be driven more by the current of wind. Wheat is cleaned from

chess in a complete manner. For cleaning grass seed, we have never witnessed anything that would compare with this fan. A mixture of clover and timothy was run through once together; in one drawer was found entirely pure timothy seed, and in another, clover without a single grain of timothy; the intermediate drawer had a very small quantity of imperfect seeds of clover, a very little timothy, and some other seeds of weeds.

The current of wind is so completely at command, that all degrees of strength from the imperceptible breeze to the blast that sweeps away heavy grain, may be readily given. This peculiarity, in connection with the screens, enables the operator to separate any seeds whatever, that differ either in *shape*, *size*, or *weight*.

A most important office performed by this machine, (fig. 12,) is the separation of the different sized seed of the same grain. Pass, for instance, ten bushels of wheat through the screens; one portion will be found a uniformly small grain; another about medium; a third, large, plump and first-rate. The first and third would not be supposed to have grown in the same field. In this way, excellent seed wheat may be obtained from an ordinary crop; and the best bushel in fifty, or the best ten bushels in fifty, may be separated at the option of the farmer.* Thus the variety may be continually improved, and the result is likely to be of the very highest importance to our agriculture. If, for example, it is desired to make the crop earlier, cut it when partly green; the ripe seeds will be the only ones of full size, and will be separated from all the rest. The size of the berry will be gradually increased by sowing only the largest. An experienced farmer declared, on witnessing the performance of this machine, "I can now secure my wheat crop completely from the midge, by increasing its earliness." The entire

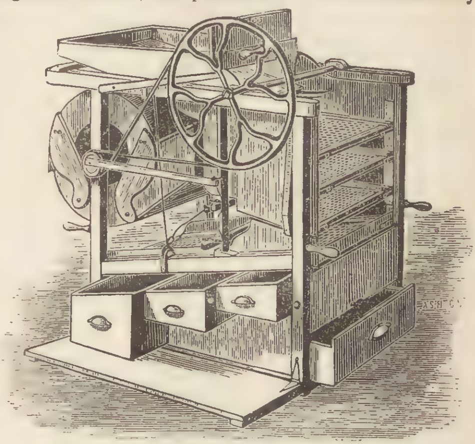


Fig. 12—Nutting's Fanning and Assorting Machine.

* An amusing occurrence took place at a late agricultural fair. Several samples of grain were exhibited for premiums. An agent of this machine, without the knowledge of either judges or exhibitor, selected the poorest sample, run it through, and replaced it in the bag, with the best portion at the top. It was examined by the judges, and much to the surprise of the exhibitor, given the first prize.

eradication of weeds from crops may be greatly facilitated by its use. Having had one in use for a year or two, we are enabled to speak with confidence of its eminent advantages.

There are several minor advantages of this fan; it runs with great ease and very little noise; is smaller than usual; its rapidity of operation is great—one hundred and twenty bushels of oats have been chaffed in an hour; and twenty bushels of timothy seed cleaned in the same length of time. Its price is moderate—about thirty dollars. Machines of larger size are made for mills and warehouses. The agent and manufacturer is Wallace Warren of Utica.

Alden's Cultivator.

This new cultivator, (fig. 13,) after thorough trial, proves to be an excellent implement. The use of the thills enables the workman to control it completely, and to cut as deep in hard soils, and as near to the rows, as he may wish. It runs with remarkable steadiness. A man with a horse will do about twice as much work in a given time on stiff soils, as with the common cultivator, and being able to cut closely to the rows without danger of striking or injuring the plants, the use of the hand hoe is nearly superseded.

Fig. 13—ALDEN'S CULTIVATOR.

The engraving nearly explains itself—the horse is attached to the hook in front of the teeth, the thills merely guiding and steadying the implement. It is more easily managed and is less fatiguing to the operator, than cultivators of ordinary construction.

The teeth being of steel plates, continue sharp till worn out. They are readily changed so as to throw the earth to or from the row. The whole weight is about 70 pounds.

For a *marker*, to lay out corn ground, a wooden bar or scantling is screwed on after the teeth are removed, in which pins or projections are inserted at proper distances, and being easily guided, makes a true and fast-working implement. Again, a prong-hoe being attached, it becomes one of the best potato diggers, by the steadiness with which it is made to follow the row, and the accuracy with which its depth is gauged.

SHRINKAGE OF CORN IN DRYING.—Seventy-five pounds of Western corn, says the *Prairie Farmer*, after thorough drying, was found to weigh sixty pounds. It was shelled; the corn weighing fifty-one pounds, the cobs nine pounds—showing a shrinkage of fifteen pounds in less than a bushel of corn.

RULES FOR FEEDING CATTLE.

The following may be adopted by those who wish to derive the largest profit from their animals, and from the food they consume.

Good pasture affords the best and cheapest food, and when pure water is always at hand, little care is required. But when supplied with other food, the owner must attend to the following particulars:

1. Always furnish warm and well ventilated apartments.
2. Observe cleanliness—curry the animals daily, and clean out the stalls at least twice a day.
3. Feed three times a day, with utmost regularity—a cow's stomach is a chronometer.
4. Keep the animals constantly in good condition, by a full supply of wholesome food and regular attendance.
5. In cold weather, the less they are turned out and exposed, the better.
6. Give a portion of roots or meal in winter with hay, and more if straw is fed—increase it towards spring, and gradually diminish it, as grass comes.
7. Turn cows to pasture gradually—an hour the first day, two hours the next, and so on.

The following rules *are adopted*, at least *in practice*, by poor managers and slipshod farmers:

1. See how little food will keep a cow alive.
2. Turn out to pasture very early in spring, so as to keep it very short all summer.
3. Give water but once a day, and that muddy, and a mile distant.
4. Turn cattle in the street whenever possible, to be assaulted by dogs and boys, and to break into neighbor's cornfields. If they are thus frequently lost, and escape regular milking, the labor of working butter will be greatly abridged.
5. Save the cost of erecting stables and sheds, and harden animals by exposure to snow storms.
6. Study economy by giving mouldy hay, or feeding on injured straw.
7. Feed irregularly; let the cows often wait an hour for breakfast, to give them an appetite. Give them a little meal once a week.
8. Let all stall fed animals lie in their own manure, and never curry them clean.
9. Do not be anxious to have their bones visible through the skin—they will be sure to protrude without any such anxiety.

The last set of rules do not appear to require any additional instructions or comments; but in illustration of the first, whole books may be written. A few briefly stated facts may not be out of place here.

Beans.—One of the most valuable substances for the food of cows in winter, is *bean meal.* Fed upon it, with hay, although giving less milk than when fed upon grass, they have actually yielded more butter. Bean meal is particularly valuable for the production of cheese. The best varieties of the white bean form a good fallow crop, and they might doubtless be more largely introduced into farm rotations. The meal should be diluted with bran, cut food, or Indian meal.

Importance of Good Feeding.—Flint states that a Swiss dairyman agreed with a German neighbor for all his milk, the German to furnish the cattle and food, and the Swiss to feed them, and pay for the milk by measure. The German was obliged to sell immediately nearly half his cows, the Swiss requiring nearly double the fodder they had formerly consumed. "I was in despair," said the owner of the cows, "at finding them using such a quantity of the best feed, although according to the strict letter of the contract. But the change soon effected was great, and the result still more striking. The quantity of milk became double, triple, and even quadruple; so that a hundred pounds of hay produced nearly three times the milk it had yielded under the old mode of feeding."

There appears to be a certain amount of food required to keep an animal in existence, with nothing to spare in the form of milk, butter and cheese. Little or no return can therefore be expected when it is thus fed. But all beyond this, yields a clear profit—which explains why the profit is so many times greater when the animal has a full supply. The first may be compared to an empty train of freight cars, which the locomotive can barely move. No goods could be carried. Add another locomotive, and a profitable business may be immediately commenced—the gain is more than a thousand fold.

Rule for Estimating the Amount of Feed.—Careful experiments show that nearly all domestic animals consume an amount of food about in proportion to their weight. A large horse or cow eats more than a small one. An elephant weighs four or five times as much as a horse, and consumes four or five times as much food. If a cow has the weight of five sheep, she will eat five times the quantity of food. There are of course some variations or exceptions, and individuals differ, but this is a fair general rule. This quantity is usually from two and a-half to three per cent., when the food is hay, with a small proportion of grain. A cow digests more thoroughly than a horse, and requires only about two and a-half per cent.; a horse three per cent. A cow weighing eight hundred pounds would therefore need about two and a-half times eight, or twenty pounds of hay a day. A horse weighing one thousand pounds would require thirty pounds. One and a-half per cent. will keep a cow alive or on her feet; but to be properly nourished so as to grow or increase in flesh, or give milk, she must have nearly double. The water used is not included, nor does the rule apply to green food.

Calculating for Winter.—The careful farmer should know nearly the weight of his animals; and the number of tons of hay and bushels of grain

on hand. By applying this rule he may learn very nearly how he will be likely to come out in spring.

SHELTER.—Caird mentions a case where a herd of cattle which had been kept housed, were turned out of stable twice a day on account of needed repairs in the water pipes, merely long enough to be watered in the yard. The quantity of milk immediately decreased, and in three days the falling off was considerable. When the repairs were made, and the animals kept in, the flow of milk returned.—(*Flint.*)

NUTRITIVE VALUE OF FOOD.—The following table shows the nutritive value of several different kinds of food, first according to theory, or from analysis; and secondly, according to the average of several different experiments; the figures giving the quantity in pounds, to be taken of each kind to be equal to any other.

	Value by Analysis.	Value by Experiment.
Good Hay,	100	100
Red Clover Hay, (well cured.)	77	95
Rye Straw,	502	355
Oat Straw,	564	220
Ruta Bagas,	676	262
Field Beets,	391	346
Carrots,	412	280
Potatoes,	324	195
Beans,	29	46
Peas,	30	44
Indian Corn,	70	56
Barley,	65	51
Rye,	58	49
Oats,	60	59
Buckwheat,	74	64
Wheat,	47	43
Linseed Oil-cake,	22	64

The theoretical values are the mean of two authorities, Boussingault and Fresenius; they usually agree very nearly, and are wide apart only in relation to rye straw and buckwheat. The results of experiments are in most instances from six different authorities; they sometimes differ greatly—the most so in relation to the straw of oats and rye, and some of the grains. Mostly, however, the results agree as nearly as could be expected, when it is remembered that the crops may have been cut at different periods, differently ground, cooked, or otherwise prepared; variously fed, and to animals of different feeding qualities. Although not fully reliable, the table will afford some valuable suggestive information.

CUTTING UP FOOD.—It scarcely pays to cut straw or other fodder by hand. It should be done by horse power. If cut quite short, say the eighth of an inch, it is a great saving to cut corn fodder, as the cattle will eat it all and digest it well. It also saves much labor of mastication with straw, and allows the intermixture of cut roots and meal. If all stuff used for litter could be cut even an inch or two in length, the manure would be worth much more by being regularly spread and intermixed with the soil. Corn fodder should be cut for this if for no other reason.

CORN FODDER.—Always sow a few acres of corn fodder. It may be done on any spare land, after corn or potatoes are planted. Plow and harrow the ground; furrow out as for planting potatoes; strew corn from a half bushel basket along the furrows, at the rate of two or three bushels per acre, or forty grains to a foot; cover by simply harrowing lengthwise; cultivate once or twice, but not hoe; mow and tie in bundles about the end of summer, or rake in winrows. It will yield ten or twelve tons of green fodder per acre,

and five or six tons of dry fodder. The great difficulty is to prevent heating and spoiling if put in stacks, even when apparently quite dry outside. Spread it over the top of hay mows, or on poles, only a few feet thick, or put it into quite small stacks with three upright rails in the center for ventilation. When cut green early in autumn, it affords excellent food for cows, while pastures are short, and increases the flow of milk.

FRUITS AND FRUIT CULTURE.

Culture of the Strawberry.

First, procure the BEST SORTS—among which, of the larger varieties, are Hooker and Wilson—and McAvoy's Superior for the south-west. Hovey's Seedling sometimes succeeds finely. These and the Triomphe de Gand, (which we have measured two inches in diameter the longest way,) are the largest. The Wilson, Hooker, and Triomphe de Gand must be cultivated in "hills," with the runners not covering the whole bed.

Spring is the best time to transplant—next, about or soon after midsummer, just after bearing, and while the plants are yet partly dormant from bearing. Set in autumn, the young plants do not always become sufficiently rooted to endure winter without injury. When transplanted in summer, cut off all the large or fully expanded leaves, leaving only the new half grown ones—dip the roots in mud—settle the earth about the roots by watering—cover them with mellow earth, and mulch an inch or two deep with stable manure free from straw. This treatment will be attended with success, and the plants will bear well next year.

Beds well hoed will last two or three years, or more—if the runners are allowed to cover the whole surface, they should be renewed every second year, by spading under alternate strips of the strawberries, the runners renewing these strips.

The Cherry Currant.

This is the largest of all the red currants, frequently measuring five-eighths of an inch in diameter, and ordinary crops from half an inch to a little less. It was formerly supposed to be a moderate bearer, but is now found to be productive. The following is the amount of a crop which we gathered this year. The number of bushes was twenty-four—they were set out in 1857, when very small, and this is their third summer. As it was intended to remove a part of these ultimately, they were placed temporarily quite thick, or the twenty-four in a row thirty feet long. The fruit this year hung in dense masses, and the row yielded a full bushel by measure. They were planted in common unmanured garden soil, and kept cultivated. An acre, like these, in rows four feet apart, would have given over three hundred bushels.

Pears for General Cultivation.

At the last winter meeting of the Fruit Growers' Society of Western New-York, the following varieties were especially commended:—Louise Bonne de Jersey, for its extensive productiveness (on the quince); Tyson, for its handsome growth and excellent fruit; Virgalieu, for its productiveness, and the great popularity and high price of its fruit; Sheldon, for its superb growth on the pear stock, and great excellence; Bartlett, for its admirable fruit and early bearing; Belle Lucrative, for its superb quality; Seckel, for its hardiness, great crops, and delicious flavor; Flemish Beauty, for its general perfection, needing, however, to be picked early; and the Lawrence and Winter Nelis as the best winter pears. The Howell, Brandywine, Beurré Diel, Washington, Duchesse d'Angouleme, Giffard, Rostiezer, Anjou, and Easter Beurre, were also highly recommended by different members. The only objection to the Vicar of Winkfield was its excessive bearing, and ordinary cultivators would not prune and thin sufficiently to make the fruit excellent. A. Pinney of Clarkson said that he found the fruit of the Louise Bonne of Jersey one-third larger when raised on dwarfs. P. Barry remarked that although the Duchesse d'Angouleme was preferred as a dwarf, yet on pear stocks the fruit continues to improve as the tree grows older, for twenty or thirty years. S. H. Ainsworth has a tree of the Louise Bonne of Jersey, twelve years old, with a barrel of pears on it.

Winter Protection.

It is best not to cover raspberries, grapevines, &c., till winter is close at hand, as they will ripen and harden better if exposed till that period. Grapevines are often sufficiently protected if simply laying flat on the ground—or at most, with an inch or two of soil. The same remark will apply to the raspberry and blackberry. Caution is needed in the use of straw around fruit trees, as it may encourage the depredations of mice. If covering the stems, it should not be closely tied about them, as the circulation of some air is best. Evergreen boughs placed about any tender trees, afford the best and safest protection. The thicker the coat they form, the more complete the covering will be.

Winter Mulching.

At the commencement of winter, those who have young trees liable to be injured by cold, and which need high culture, will find an especial advantage in applying a winter mulching of short manure. This treatment is eminently useful for DWARF PEARS. Protecting well the part below ground, is of use to the exposed portions above—in the same way that a man's feet and ears have been found to keep warmer on a cold day, when his body is well clothed.

The best time in the year to manure trees is late in autumn. If applied earlier, it prevents proper cultivation; and if in spring, its protecting influence is lost, and the liquid portions do not become so well diffused through the soil by the time that growth commences. The manure should be SHORT, (not necessarily old or rotted,) to prevent attracting mice; or if short manure cannot be had, a small cone of fresh earth should be raised around each tree eight or ten inches high, which will effectually exclude the mice. In the spring, the manure is spaded in, if in a garden, or worked under by means of a gang-plow, if in an orchard kept clean by horse power.

Grape Trellis.

In answer to several inquiries, we give the annexed cut, (fig. 1,) representing the mode of constructing wire trellis for grapes, as adopted by Dr. Farley of Union Springs, in his excellent vineyard at that place. The posts are white cedar, mostly round and rough; they are set in the ground about two and a-half to three feet, are seven feet high above ground, and twelve feet apart. At the ends, they are braced as represented on the left portion of the figure, the powerful stress of the wires requiring a firm support. The wire, which is No. 10, is placed about 14 inches apart, the bottom one about two feet from the ground, and the upper about six and a half to seven feet high. At the ends, the wires pass through or around the posts; they are attached to the intermediate ones by staples. The vines are trained on this trellis mostly in the fan form, and where necessary are fastened to the wire by cotton cord.

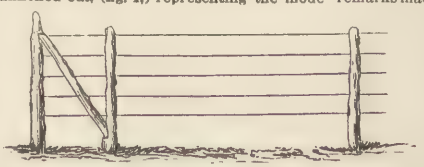


Fig. 1—GRAPE TRELLIS.

The cost of this trellis is 75 cents to one dollar per rod. The cut represents only one length between posts, besides the end-bracing.

Orchards in Illinois.

A discussion was held at the fair of the Illinois Agricultural Society, and some valuable suggestions made in relation to the management of western orchards. One cultivator remarked, that "carelessness is the cause that farmors do not raise fruit—a tree wants nursing from infancy as well as a child." W. W. Beebe of Iowa, would plant trees deeper on elevated lands, that wash; he had no doubt that fruit could be grown in northern Illinois, with these precautions, namely; 1, NOT TO PLANT MORE TREES THAN CAN BE TAKEN CARE OF; 2, subsoil the ground, so that no large holes are needed; 3, dig the trees in autumn, bury them, and set them in spring; 4, select trees with low heads, and lean them to the south-west in planting them; 5, protect from strong winds by belts of deciduous trees. —— Mills of Marion county, spoke in favor of good cultivation, remarking, that as long as he cultivated his trees they did well, but when he seeded his orchard, "his success would have been as good if he had cut them down."

Cultivators were divided in opinion in relation to shelter—some strongly recommending it, and others saying their trees had done better when fully exposed to the winds. From remarks made, we infer that the "protection" was accompanied with SHADING. While the aim should be to prevent the bad effects of sharp cutting winds, there must be plenty of sun and air.

The following varieties are generally approved for that region, as being both hardy and productive: Red Astrachan, Carolina Red June, Keswick Codlin, Sweet June, Maiden's Blush, Fameuse, Willow Twig, Winesap, White Pippin.

DOMESTIC ECONOMY.

Removing Stains.

Receipt books give an almost endless number of directions, without the reasons, in the form of a vast undigested mass of remedies. A knowledge of the substances, and the application of chemical principles, greatly simplifies the act, and renders intelligible and certain, what before was only accomplished guess-work and endless trials.

GREASE STAINS.—These are from grease, oil, &c., and are simply removed by alcalies or soap, or by essential oil dissolved in alcohol. Alcalies, such as solutions of saleratus or liquid ammonia, will remove them safely from all substances without color. For other substances, the alcoholic solutions spoken of will do, and among them burning fluid answers a good purpose. But the best of all is the new preparation termed BENZINE, which exceeds anything else we know of in efficiency. Lay a paper under the fabric and apply the liquid. Oil spots and stains from candle snuff, on woolen table covers, paint spots on garments, &c., are thus perfectly removed, without the slightest discoloration.

ACID STAINS.—These may generally be known by REDDENING black, brown, and violet dyes, and all blue colors except Prussian blue and indigo. Yellow colors are generally rendered paler, except the color of annato, which becomes orange.

These stains are neutralized by alcalies. A spot, for instance, on a woolen coat, from strong vinegar or sulphuric acid, may be entirely removed by applying a solution of saleratus. Apply it cautiously until the acid is exactly neutralized, which may be known by the restoration of color; and then sponge off the salt thus made by means of a sponge. Ammonia is better for delicate fabrics.

Sweat stains are chiefly occasioned by a little muriate of soda and acetic acid—which produce nearly the same effects as acids generally, and are to be removed in the same way, operating cautiously.

ALCALINE STAINS.—These are the opposite of acid stains—they change vegetable blues to green, red to violet, green to yellow, yellow to brown, and annato to red. They are to be treated with acids. The writer once had a new pair of dark cloth pantaloons changed to a light brown below the knees, by riding on a load of fresh lime in a storm. "Oh! you have ruined your clothes!" was the exclamation; but he deliberately procured a cup of vinegar, and sponging the cloth gradually, completely restored the color, and then again sponging off the compound, left them as good as before.

IRON STAINS.—These come from iron-rust, ink, &c. To remove them, the iron is first dissolved by a solution of oxaxlic acid in water. The oxalate of iron thus produced, which, unlike iron rust, is soluble, is readily removed by washing or soaking. Ink spots (tanno-gallate of iron,) upon the printed leaves of books, are removed in the same way—but the lamp-black of the printer's ink is not at all effected. If fresh, such spots may be wholly effaced; if old and dry, a very little will remain.

Wheel grease makes a compound stain of grease and iron. The grease may be taken out first by alcali; and then the iron by oxalic acid. If tar has been used on the wheel, rub on lard, which will dissolve it, and then apply the alcali. Turpentine will answer nearly the same purpose as lard.

VEGETABLE STAINS.—These include fruit stains, and may be removed with chlorine or sulphurous acid. A diluted solution of chlorine will remove them; or if practicable, chlorine in a gaseous state will be better, the place being wet. Sulphurous acid, or the strong fumes of burning sulphur will effect the same purpose, but much more slowly, and perhaps more safely. Both these substances will, however, remove any other vegetable color which may have been used for dyeing the fabric.

To remove stains from calico or other colored substances, without affecting the original hue, requires not only a knowledge of the materials used in dyeing, but of those which will dispel the stain without affecting these dyes, and would be too extended a subject for our present limits.

Cheap and Excellent Ink.

Take half an ounce of extract of logwood, ten grains of bi-chromate of potash, and dissolve them in a quart of rain water, in a bottle, kept uncorked. This is the whole process, and the cost will be about three cents a quart. But failure will result, unless the bottle is perfectly clean, and unless the ink is poured out into an inkstand perfectly clean from any other ink. Do not forget also to leave the bottle uncorked. Do not mistake chromate for bi-chromate of potash. Running the logwood in solution first through a fine strainer, is said to be effectual in preventing the sediment which sometimes adheres to the pen, but this the writer has not tried. The ink

itself has however been fully tested for about a year; and having published the directions some time ago in the Country Gentleman, several of the correspondents of that paper have affirmed that the receipt was worth more than a year's subscription.

How to Corn Beef.

The following is our method:—Add two pounds brown sugar to eight gallons of water, also one quart of molasses, four ounces of nitre, and fine salt till it will float an egg. This is enough for two quarters of beef.

Making Soap.

The best process for making soft soap is simply this:—First, Procure good ashes; place a half peck of caustic or water-slacked lime, in the bottom of the leach, for each barrel of ashes; if air-slacked, the quantity must be larger, according to the time it has been exposed to the air. It is usual to place straw below the lime, to prevent the water from carrying it off in particles. Place the ashes on the lime, beating it compactly as each successive layer is applied, till the leach is full. If not beaten solid, the water will run through too soon, and the lie will be weak.

A stout barrel, slightly inclined, with a hole bored through the bottom, makes a good leach. It should be placed on a piece of broad plank, with a gutter cut around it, to collect the lye; and high enough from the ground to set a tub under. The water poured upon the ashes should be hot, until the lye begins to run; and the time that should elapse after the water is first applied, till it passes through as lye, should not be less than twenty-four hours; if sooner, the ashes has not been beaten sufficiently, and the lye will be too weak. It will continue to run as long as water is applied, but at the same time growing weaker, as the potash becomes carried off.

If the ashes could be perfectly fresh, no lime would be required in the leach; as when first burned, ashes are caustic, but gradually lose this quality by absorbing carbonic acid from the air. The lime abstracts this carbonic acid, and renders the lye again caustic.

If lye is not strong enough to float an egg, it will not make good soap—but we have known it to do this, and still cause a failure, if not sufficiently caustic. The last named defect may generally be ascertained by pouring in a portion of some strong acid, as aquefortis or oil of vitriol, which will cause a violent effervescence—even strong vinegar will do. When this is the case, it shows that enough lime has not been used; and it may still do to apply it. We have known its use to cause success even after the materials for the soap had been mixed together.

The grease must be FIRST BOILED—then a pint of lye added—afterwards a quart—and so on by gradual additions until the soap is made. A barrel of good ashes will make a barrel of soap—but if the lye is strong enough to combine well with the grease, the soap will be too strong, and injure the clothes. This is remedied by adding a pail of water to each pai of freshly made soap, or diluting it.

Preserving Fruit in Cans.

The following method is given by a correspondent of the COUNTRY GENTLEMAN:—To one pound of the fruit, I put a quarter of a pound of white loaf sugar. Put them over the fire together. Let them boil up once. Then have your cans in a pail of water as hot as possible without breaking them—have THEM also filled with water of the same temperature. Let them remain so for a few moments. Then, while the fruit and sugar are boiling hot, fill the cans while they are setting in the water. They must be filled to the very top. Then put the cover on, and seal with cement. After filling them, take them out of the pail of water and put them away to cool. After they are COLD, turn them over on the cover side, and let them remain so until you wish to use them.

I have saved fruit in this way for three years; and have now strawberries and peaches that are as fresh as though they were picked this year, which are a year old.

I always use the glass cans, for I consider them more pure than any other kind.

Sweet Pickled Tomatoes.

One peck of green tomatoes sliced—six large onions sliced—strew a tea-cupful of salt over them; let them remain over night—drain off in the morning—then take two quarts of water and one of vinegar—boil them in it 15 or 20 minutes; after boiling put them in a sieve to drain—then take 4 quarts of vinegar, 2 pounds of brown sugar, half pound white mustard seed, 2 table-spoonfuls of ground alspice, same of cloves, cinnamon, ginger and mustard, and one tea-spoonful of cayenne pepper—put all in a kettle and cook 15 minutes SLOWLY, and you will pronounce them capital.

Preserving Green Corn for Winter Use.

Cut the corn off the cob, and put it in a stone jar, with a handful salt to a pint of corn. When the jar is full, put a weight on it. When you wish to use it, remove a little of the top, and wash and soak over night.

FARM NOTES.

Culture of Carrots.

1. The carrot wants a deep, rather light, sandy loam soil, of the highest degree of fertility; but will succeed on a strong loam, if dry and mellow. When the subsoil is hard, deep subsoiling is of great value. If thoroughly plowed and manured the previous year, it would be best, except on the very lightest soils, which do not hold manure—2. Early sowing is best, say as early or before the first planting of corn. Later crops are sometimes injured or prevented from vegetating by drouth—3. The Long Orange and the White carrot are the two best sorts. The White is perhaps most productive, and much more easily harvested—but it is not generally considered to be quite so rich as food, and it is in greater danger of injury from late autumnal frosts—4. Sow in drills with a planter, two and a-half to three feet, and thin out to six inches in the drill, if the soil is rich; or four inches if not rich.

Rotation of Crops.

A favorite rotation in many places is—1. Corn (and roots,) with all the manure—2. Barley, peas and beans—3. Wheat, with clover seed—4. Clover, pasture or meadow, one, two, or three years. If the soil is strong, oats may be substituted for barley, but a moderate dressing of well rotted manure on the oat stubble, is a great improvement, or perhaps quite as useful or more so, on heavy soils, would be a thin dressing of long manure on the wheat after it is up, just at the beginning of winter.

Corn Husker.

A correspondent of the COUNTRY GENTLEMAN thinks there will never be a corn husker invented, superior to one he describes as follows:

It is generally of iron or bone, about half an inch wide, with two holes made in it and

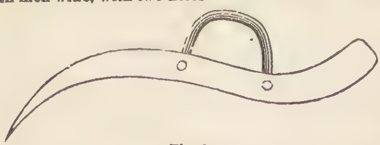


Fig. 1.

a leather strap put in, forming a loop; slip this over a finger of the right hand, and you are equipped. An active hand with this, can out-husk any machine that can be made to do it with neatness.

Smutty Wheat.

Smutty seed produces a smutty crop. The seed of the smut fungus, when examined by the most powerful microscopes, are found to be much smaller than the vessels or sap pores of the plant, and are doubtless carried through them. The experiment has been made by sowing good grains from a smutty crop, and which were no doubt well dusted with the fungus seeds. A portion was planted without any preparation, and the crop had many smutty heads in it. Another equal portion of seed was repeatedly washed in water, and the number of smutty heads was many times less. A third portion was washed in brine, with a still more favorable result. The best way is to wash first in water, then in brine, and then roll the seed in slacked or powdered lime. This process, if care is taken to prevent the seed from becoming tainted from foul bags or other sources, will nearly extirpate it.

Best Form of Tile for Draining.

Never have a flat bottom for a channel. The discharge gutter at one of our colleges was found to become frequently choked with sediment, and to require frequent cleaning at great trouble and expense. It was made of plank, nailed together, forming a square tube, lying on one of its flat sides. "Turn the tube, so as to rest on one of its corners," said the professor of hydraulics. It was done—and it never became again choked—for the little water which ran through it, instead of being spread out over a broad flat surface, was concentrated into a narrow corner, and swept off all that became deposited there.

Drill vs. Broadcast Seeding.

The Homestead argues in favor of drill-seeding, that grain so sown is more likely to grow than when distributed broadcast. "The kernels are all sown at the same, and this the most desirable depth; they are not covered by sods, nor dropped upon the same; they are uniformly dropped, and the ground between the rows affords passage way for clearing out coarse weeds if it is desirable, as it often is."

DAIRY HUSBANDRY.

Requisites for Making Good Butter.

There are a few butter-makers who have established such a reputation for making the very best article, that all they can spare for market is eagerly taken at several cents a pound above the market priçe. So far as we know, they all adopt the following rules; or if they do not, they practice them:—

1. A perfectly clean cellar, not only clean from all dirt, but from every bad odor—pure, sweet, and fresh.

2. Perfectly clean, well aired vessels. Not an infinitessimal speck of any foreign or sour substance adheres to any of them.

3. Churning before the cream becomes old.

4. Securing such a temperature that it will require about half an hour for churning—if performed much sooner, a loss of butter must occur, and it is not so good.

5. Work all the buttermilk out, which is rarely done—and work no longer, which is still more rarely, but sometimes done.

6. Use the purest salt—and add an ounce to a pound.

7. Pack the butter in the jars or firkins SOLID—put as much in a small space as possible.

8. Lastly, and first also, provide good sweet pasture, and plenty of perfectly pure water for the cows at all times.

If any have practiced all these, and have not succeeded, we should like to hear from them. It is proper to state, however, that there are some who assert that their vessels, &c., are clean, when in fact they are far from it.

Restoring Tainted Butter.

A good housekeeper gives the following process, but we have not tried it:—

Cut or break the butter into grains or very small pieces, by passing it through a coarse sieve or otherwise. Put it into the churn with a sufficient quantity of NEW MILK to float it, and churn it well, which will free it from the bad taste, when it may be taken out and worked and salted, as new butter.

To Cure Kicking Cows.

1. Never allow the slightest degree of heat or passion, or departure from perfect self-control.

2. Never strike the animal but once at a time—no matter what the provocation may be—a single, sharp cut with a switch (kept under the left arm,) excites fear and alarm—two or more strokes produce a re-action, and cause rage but not fear.

3. Adhere faithfully to the principles of cause and effect, and the animal will quickly understand these principles, if the single, alarming stroke always instantaneously follows EVERY attempt to kick.

4. Treat the animal in a firm, soothing, gentle manner at all times,—only let the blow always come quickly after every kick; whether it be merely an ABORTIVE ATTEMPT, or the whole pail of milk is upset—the INTENTION of the animal was the same.

I do not wonder that so many fine cows are spoiled, that are treated according to passion and caprice, and not according to principle nor rule. If a cow kicks maliciously, but happens to hit no one, the milker takes no notice of it; if a mere accidental movement of the foot oversets a pail of milk, a shower of furious blows follows, and it becomes impossible for any brute to know from such irregular practice, what connection there is between the punishment and the offence.

Pumpkins for Milch Cows.

A correspondent of the New-England Farmer gives his experience as follows:—"First, I fed my cows one week with one large or two small pumpkins to each cow, twice a day. Their milk decreased two or three quarts to each cow a day, from what they gave the first week previous. I then fed them one week with the same quantity of pumpkins as before, and took out the seeds. They increased in a greater proportion of milk than they decreased the week previous. I then fed them alternately, three or four weeks, and they varied in their milk very much as the first weeks."

Regularity in Milking.

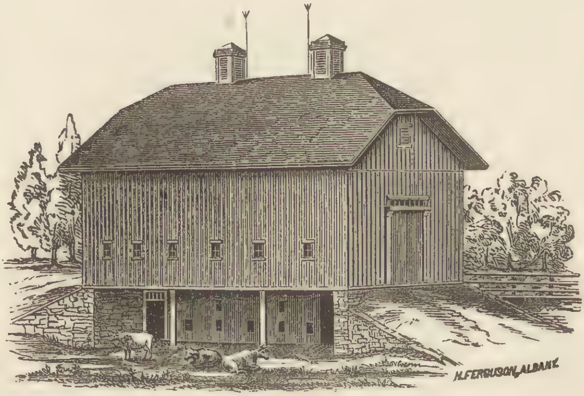
A noted dairyman of Portage Co., O., remarks on this subject as follows, in the Boston Cultivator: "Each cow should have a steady milker, be milked as fast as possible, and all the milk drawn. I am satisfied that there is a loss of one-third in many dairies, by the lazy, hap-hazard way in which cows are milked. I have known persons to sit down in the milking-yard, and go through with some long yarn, and be from ten to twenty minutes milking one cow, when it should be done in less than five.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.



FARM BUILDINGS.

THRIFTY farmers keep two leading points in view—first, to raise all they can from their lands; and secondly, to take good care of these products after they are raised. Or, as the old maxim has it in reversed order, they "keep all they can get, and get all they can;" not applying it, however, to their intercourse with men, but with their farms only.

They get all they can, by preserving and increasing the permanent fertility of their fields; and they keep all they get, by not wasting their crops from a want of shelter, nor their flocks by exposure to storms and cold.

The amount of waste occasioned by exposure is not estimated by careless managers. Cattle have been found to remain in better order in stables than in exposed places, on two-thirds of the food—one-third being consumed in sustaining animal warmth in open air. Milch cows, well protected, give about one-third more milk. For a herd of twenty cows, therefore, about ten tons of hay would be saved every winter, and at least $25 worth of milk—

total, $150. That part of the barn occupied by their stables, would not cost more than twice this sum. In other words, the stables would pay for themselves biennially. They would, in short, pay $1,500 in ten years, besides interest; or with interest, about $2,750—double the entire cost of a fine barn.

Northern sheep raisers find that the saving of life and the increase in the amount of mutton and wool, afforded by good shelter, will pay for the erection of buildings every two years.

By continuing the preceding estimates, it will be discovered that, taking every thing into account, the farmer who neglects to provide good farm buildings, sinks a handsome fortune every twenty years, greater or less, according to the extent of his operations.

ESTIMATING THE CAPACITY OF BARNS.

Very few farmers are aware of the precise amount of shelter needed for their crops, but lay their plans of out-buildings from vague conjecture or guessing. As a consequence, much of their products have to be stacked outside, after their buildings have been completed; and if additions are made, they must of necessity be put up at the expense of convenient arrangement. A brief example will show how the capacity of the barn may be accurately adapted to the size of the farm.

Suppose, for example, that the farm contains one hundred acres, of which ninety are good arable land; and that one-third each are devoted to meadow, pasture, and grain. Ten acres of the latter may be corn, stored in a separate building. The meadow should afford two tons per acre, and yield sixty tons; the sown grain, 20 acres, may yield a corresponding bulk of straw, or forty tons. The barn should, therefore, besides other matters, have a capacity for one hundred tons, or over one ton per acre as an average. Allowing 500 cubic feet for each ton (perhaps 600 would be nearer) it would require a bay or mow 40 feet long and 19 feet wide for a ton and a half to each foot of depth. If twenty feet high, it would hold about thirty tons. If the barn were forty feet wide, with eighteen feet posts, and eight feet of basement, about forty-five tons could be stowed away in a bay reaching from basement to peak. Two such bays, or equivalent space, would be required for the products of ninety well cultivated acres. Such a building is much larger than is usually allowed; and yet without it there must be a large waste, as every farmer is aware who stacks his hay out; or a large expenditure of labor in pitching and repitching sheaves of grain in thrashing.

In addition to this, as we have already seen, there should be ample room for the shelter of domestic animals. In estimating the space required, including feeding alleys, &c., a horse should have 75 square feet; a cow 45 feet; and sheep about 10 square feet each. The basement of a barn, therefore, 40 by 75 feet in the clear, will stable 30 cattle and 150 sheep, and a row of stalls across one end will afford room for eight horses. The thirty acres each

of pasture and meadow, and the ten acres of corn-fodder, already spoken of, with a portion of grain and roots, would probably keep about this number of animals, and consequently a barn with a basement of less size than 40 by 75 would be insufficient for the complete accommodation of such a farm in the highest state of cultivation.

FORM OF BARN BUILDINGS.

It has formerly been a practice, highly commended by writers, and adopted by farmers, to erect a series of small buildings in the form of a hollow square, affording an open space within this range, sheltered from severe winds. But later experience, corroborated by reason, indicates the superiority of a single large building. There is more economy in the materials for walls; more in the construction of roofs—a most expensive portion of farm structures; and a saving in the amount of labor, in feeding, thrashing, and transferring straw and grain, when all are placed more compactly together. The best barns are those with three stories; and nearly three times as much accommodation is obtained thus under a single roof, as with the old mode of erecting only low and small buildings.

An important object is to avoid needless labor in the transfer of the many tons of farm products which occupy a barn. This object is better secured by a three-story barn than by any other, where a side-hill will admit of its erection. The hay and grain are drawn directly to the upper floor, and nearly all is pitched downwards. If properly arranged, the grain is all thrashed on this floor, and both grain and straw go downwards—the straw to a stack or bay, and the grain through an opening into the granary below. Hay is thrown down through shoots made for this purpose to the animals below, and oats are drawn off through a tube to the horses' manger. The cleanings of the horse stables are cast through a trap door into the manure heap in the basement. These are the principal objects gained by such an arrangement; and as the labor of attendance must be repeated perpetually, it is very plain how great the saving must be over barns with only one floor, where hay, grain, manure, &c., have to be carried many feet horizontally, or thrown upward.

HOW TO PLAN A BARN.

The first thing the farmer should do, who is about to erect a barn, is to ascertain what accommodation he wants. To determine the amount of space, has already been pointed out. He should next make a list of the different apartments required, which he may select from the following, comprising most of the objects usually sought:

1. Bay or mow for hay.
2. Bay or mow for unthrashed grain.
3. Bay or mow for straw.
4. Thrashing floor.
5. Stables for horses.
6. Stables for cattle, and calf pens.
7. Shelter for sheep.
8. Root cellar.
9. Room for heavy tools and wagons.
10. Manure sheds.
11. Granary.
12. Harness room.
13. Cisterns for rain water.
14. Space for horse power.

If these are placed all on one level, care should be taken that those parts oftenest used should be nearest of access to each other; and that arrangements be made for drawing with a cart or wagon in removing or depositing all heavy substances, as hay, grain, and manure. In filling the barn, for example, the wagon should go to the very spot where it is unloaded; the cart should pass in the rear of all stalls to carry off manure; and if many animals are fed in stables, the hay should be carted to the mangers, instead of doing all these labors by hand.

If there are two stories in the barn, the basement should contain,

1. Stables for cattle.
2. Shelter for sheep.
3. Root cellar.
4. Coarse tool room.
5. Manure shed.
6. Cistern.
7. Horse power.

The second floor should contain,

1. Bays for hay and grain.
2. Thrashing floor.
3. Stables for horses.
4. Granary.
5. Harness room.

For three stories, these should be so arranged that the basement may be similar to the two-story plan, and the second story should contain,

1. Bay for hay.
2. Stables for horses.
3. Granary.
4. Harness room.

The third or upper story,

1. Thrashing floor.
2. Continuation of hay bay.
3. Bays for grain, including space over floor.
4. Openings to granary below.

In all cases there should be ventilators, shoots for hay, ladders to ascend bays, and stairs to reach quickly every part; besides which every bin in the granary should be graduated like the chemists' assay-glass, so that the owner may by a glance at the figures marked inside, see precisely how many bushels there are within. A blackboard should be in every granary, for marking or calculating; one in the stable, to receive directions from the owner in relation to feeding; or keeping accounts of the same; and a third should face the thrashing floor, for recording any results.

Corn cribs require a free circulation of air, and open work for air large enough to admit rats and mice; they should, therefore, be separate buildings, placed on columns which these animals cannot ascend. Apartments for swine are likewise usually preferred in a separate building.

BASEMENTS.

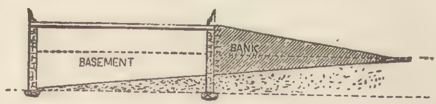


Fig. 1.

It may be laid down as a general rule, that every barn should have a basement. Its only cost is excavation and walls. The building need not necessarily be on a hillside, as a moderate artificial mound and a short bridge will afford ready access by teams to the

floor above. A slope of two and a half feet only, will answer a good purpose; the two and a half feet of excavated earth will make a good embankment for wagon way. If this way is as long as the width of the barn, its first rise will be five feet above the bottom, as exhibited by fig. 1, the lower dotted line being the level of the cellar bottom, and the one next above, five feet above it.

If the ground is a dead level, (which rarely happens,) the cut, fig. 2, will show the manner of forming the embankment, connected with the barn by a short bridge. About one foot of earth is taken from the whole surface of the basement, and carted for the wagon way.

Fig. 2.

If the basement walls are built of stone, the security they afford the sills against moisture and decay will save enough to pay for excavation and constructing wagon way.

Whenever practicable, the basement should not be less than eight or nine feet high; the only exceptions may be where the ground is perfectly level. The posts of the upper story should be 16 feet high for small barns, and 19 or 20 feet for large ones. The same amount of roof being required in either case, it is a matter of economy to use high posts.

COST OF BARNS.

The following general rule may be adopted, subject to some variation in different localities, according to the price of lumber, labor, and economical management on the part of the builder:

A common, well built farm barn, not planed or painted, with stone basement, will cost $1 for each two and a half to three square feet. For example, a barn measuring 35 by 50 feet, and containing 1750 square feet, will cost from $585 to $700. If planed and painted, and correspondingly finished, $1 will pay for about two square feet; and it would consequently cost about $875. Farmers who are about to plan and erect barns, will find this approximative rule, derived from a number of actual bills of cost, of considerable convenience.

DESIGNS FOR BARNS.

DESIGN I.

A BARN FOR FIFTY ACRES OR LESS.

The plan here given is sufficient for a farm containing fifty acres under cultivation, and yielding good crops, with general or mixed husbandry. For special departments of farming, it must be modified to apply to circumstances.

Fig. 4 is a plan of the principal floor. Being built on a moderately descending side-hill, the threshing floor is easily accessible through the wide

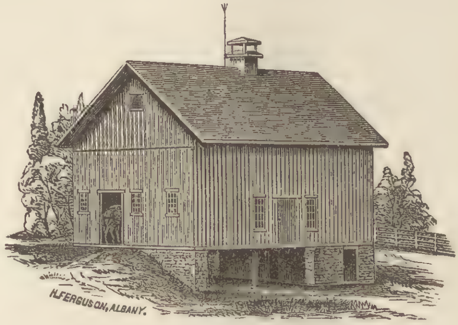


Fig. 3—Perspective View of Design I.

doors on the further side, and the wagon, when unloaded, is backed out. These doors should be each at least five feet wide, so as to give an opening of ten feet; and about twelve feet high, to allow ample space to drive in a load of hay. The door at the other end of the floor is about five feet wide, and is used for throwing out straw. A narrow window on each side of this door, and one with a row of single horizontal lights over the large doors, keep the floor well lighted, when stormy weather requires the doors to be shut.

The bay, on the right, will hold at least one ton of hay for every foot of height, or some 20 or 25 in all. By marking the feet on one of the front posts, the owner may know, at any time, with some degree of accuracy, how many tons of hay he has in this bay, after it has become well settled. The upright shaft, V, serves at the same time to ventilate the stables below, and for throwing down hay directly in front of the cow stables. It should be made of planed boards inside, that the hay may fall freely, and for the same reason it should be slightly larger downwards. It should have a succession of board doors two feet or more square, hung on hinges so as to open downwards, through the openings of which the hay is thrown down for the animals. When not in use, these doors should be shut by turning upwards and buttoning fast. A register should be placed in this shaft, to regulate the amount of air in severe weather. This may be a horizontal door at the bottom, dropping open on hinges, and shut by hooking up closely or partially, on different pins.

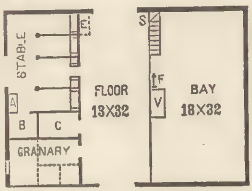


Fig. 4—Principal Floor.

A. A trap door, for throwing down manure.
B. Closet for harness, saddle, buffalo skins, &c.
C. Tool room.
E. Trap door for straw and roots.
F. Ladder to bay.
V. Ventilator and hay shoot.
S. Stairs to basement.

Fig. 5 shows the form of the ventilator at the top of the building. It is

made of wood, except the four iron rods or bolts at the corners, and secures the advantages of Emerson's excellent cap, which causes the air to draw upward at all times when there is wind from any quarter. Fig. 6 is a section showing the interior.

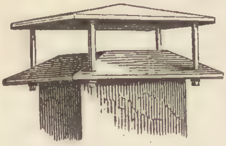


Fig. 5.

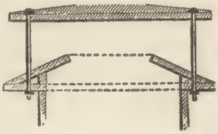


Fig. 6.

A fixed ladder, on the line between the bay and the floor, enables the attendant to ascend readily at any moment.

As a basement is usually too damp for horses, a stable large enough to hold five is placed on this floor. The middle stall will receive two horses to stand abreast; and being placed opposite to the door six feet wide, will readily admit a span in harness, for temporary feeding, which is often a great convenience. A narrow passage from this stall admits the attendant to the barn floor. A trap door at A. allows the cleanings of the stable to pass at once to the manure heap below.

These stalls are represented as only four feet wide. Five feet would probably be better, making but one narrow stall on each side the wide one, and allowing room for four horses in all. A door under the girth, at E, allows straw and roots to be discharged into the root cellar below—the roots being first deposited there, and then a few feet of straw upon them, protects from freezing.

The Tool Room, (Fig. 4, C.) A place for every thing, and every thing in its place, will save many hours of searching, many weary steps, and much vexation, every year. The tools should not only be in the room, but every one in its place, where the hand may be always laid on it in a moment. For this purpose they should be hung up against the wall, and be neatly arranged. Nearly every tool can be hung on a spike or pin, or between two large nails. If hung perpendicularly, they will occupy less room, and may be quickly taken down and replaced. Fig. 7 shows the manner in which the smaller tools may be thus arranged; and fig. 8 exhibits the larger tools hung on the opposite wall of the same room. In order that each tool may be always in its place, the plan devised by Townsend Sharpless, of Phila-

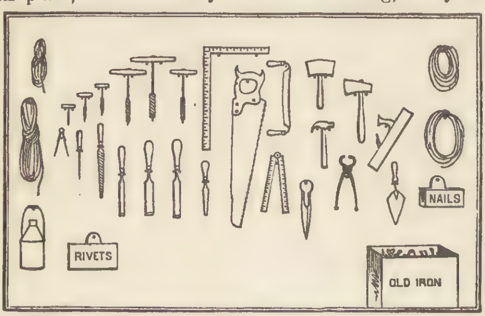


Fig. 7—Interior of Tool Room—Small Tools.

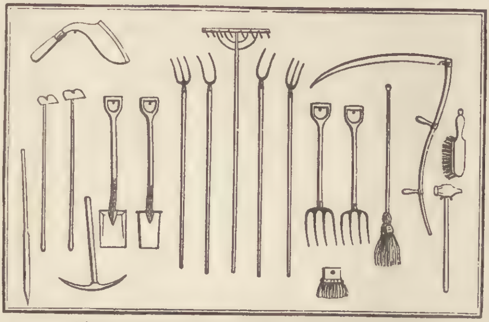


Fig. 8—Interior of Tool Room—Large Tools.

delphia, is the best. Hang each tool in its position; then draw its outline accurately on the board wall with pencil or chalk; then with a brush dipped in some dark colored paint, make a distinct representation of the shape of the tool. These outlines will not only show where the tool should be put, but show at a moment if any has been left out of place. The consciousness that there is such a tell-tale in the tool room, will stimulate any careless laborer to return every thing which he takes out.

The Granary, 8 by 13 feet, contains three bins, which have a part of the front boards moveable or sliding, so that when all are in their place, they may be filled six feet high. They will hold, in all, about 350 bushels. The contents of each bin may be readily determined by measuring and multiplying the length, breadth, and depth, and dividing the number of cubic feet thus obtained by 56, and multiplying by 45. The result will be bushels. It will, therefore, be most convenient to make each bin even feet. A scale should be marked inside, showing the number of bushels at any height. Bags may be marked in the same way, after trial, with considerable accuracy, and save much trouble in measuring, for many purposes, but not for buying and selling. A short tube, with a slide to shut it, may pass downward from one or more of these bins, so that bags placed in a wagon in the shed below, may be easily and rapidly filled.

A bay for unthrashed grain occupies all the space over the horse stable, tool room, and granary; and moveable poles or platform over each end of the floor also admit a considerable quantity besides.

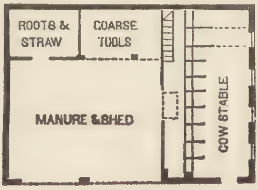


Fig. 9—Basement.

The Basement, (Fig. 9.) This needs but little explanation. The cows are fed from the passage in front of them, into which the hay-shoot discharges, in front of which a door opens to the shed, for the ready feeding of animals outside. The two inner stalls shut with gates, and serve for calf pens when needed. Coarse implements, as sleds in summer, and wagons and carts in winter, may occupy the inclosed space adjoining, entered by a common gate. If a lever horse power for thrashing is used, it may be placed in the "shed" in the

basement; but it would be better to use a two horse endless chain power, which may be placed on the floor above, and used for thrashing, cutting stalks, and other purposes. The farmer may thus do his own thrashing, in winter and on stormy days, with the assistance of a hired man, not only thus saving much expense, but turning out a fresh supply of straw whenever needed. The cost of this barn, if built rough, would be about $500; planed and painted, $600 or $700.

In order to prevent the bank of earth from crowding in the cellar wall, the latter should be made thick and substantial on the upper side.

DESIGN II.

BARN FOR SEVENTY-FIVE TO A HUNDRED ACRES.

(A view of which is placed at the head of the article on p. 125.)

This barn stands on a slight declivity, and is so constructed that a wagon may be driven through it, obviating the necessity of backing out. Its size is forty-two by sixty feet. (Its capacity may be increased to any extent by greater length.) The main floor is lighted by a long horizontal window over each double door; the trap door for straw turns down and buttons up under the girth; if desired, two more may be placed outside the ventilators. A smooth planed shoot below allows the straw to slide freely in the root and straw cellar below, and a cart of roots is dumped down this shoot. Roots will keep finely if a foot of straw is first thrown down, then several feet of roots, then a few additional feet of straw or chaff, to protect them from freezing.

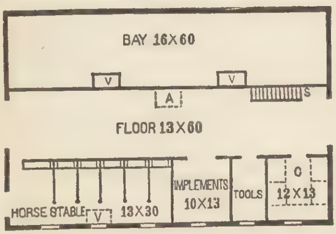


Fig. 11—Principal Floor.

A. Trap door and shoot for straw and chaff.
G. Granary.
V.V. Ventilators and hay shoots.
S. Stairs to basement.

There are two ventilators at the side of the bay, through which hay is thrown down into the feeding passage below; the mode of constructing these shafts is already described. A third is placed over the passage in the horse stable, for the purpose of ventilating only. They are made to unite at the ridge of the barn by extending them up next to the roof, as shown by a section in Fig. 12. This bay contains 960 square feet, and will hold about forty tons of hay, or two tons for every foot of rise, when the hay is well settled; and if one of the ventilator shafts is marked in feet outside, the owner may see at any time nearly how much he has on hand. A fixed ladder for ascending it may be placed near A.

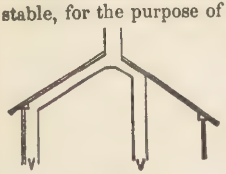


Fig. 12.

The Horse Stable is 13 by 30 feet, and contains five single stalls, each four

and a half feet wide, and one double stall seven feet wide, for a team to feed when in harness, and readily accessible through the wide stable door. One or two small trap doors allow the attendant to cast the cleanings through to the manure shed below; and a cast-iron drainage plate, slightly concave, set with holes, (Fig. 13,) allows all the liquid to fall on the manure heap, which, if necessary, should have an amount of absorbents, such as straw, sawdust, or coal ashes, sufficient to prevent waste. This stable is well lighted with three small glass windows.

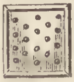


Fig. 13.

Next adjoining the stable is a room, 10 by 13, for holding all coarse tools or implements connected with the farm; and next to this is a smaller room for the smaller tools, such as are represented in Fig. 7, which need occupy but one side, while the other side may have a work bench and vice.

The Granary is 12 by 13 feet, and contains five bins, which will hold over 600 bushels. The rear and larger bin may contain mixed grain for cattle and horse feed, and be discharged through a tube into a wagon below. The smaller ones may have the bottoms raised eight inches above the floor, with an opening and slide in front of each, and a recess beneath, so that a half bushel may be placed under the opening, and filled in a moment with little labor. The granary being on the corner of the barn, with the barn floor on one side and the tool room on another, is less liable to be entered by rats, than if surrounded by concealed passages.

All the space over the granary, tool rooms, and horse stables, may be filled with unthrashed grain, besides the poles or platforms extending across the ends of the space over the floor.

A slate and pencil should always hang in the granary, to keep reckonings, register orders, &c.

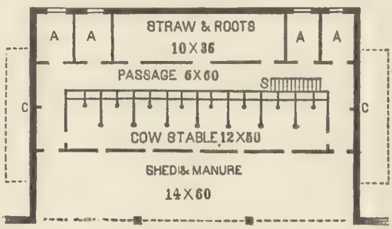


Fig. 14—Basement.

A. A. A. A. Boxes or pens for calves and cows with calf, 6 by 10 feet each.
C. C. Cisterns under the wagon-way or abutments, from which water for cattle may be drawn through a cock.

The plan of the basement nearly explains itself. The mode of filling the root room has been already described. There are a number of sliding board windows in the rear of the cow stalls, for throwing out manure, and over a part of them glass windows for admitting light. It will be observed how accessible the roots, straw and hay are in front; and that the manure in the rear is easily drawn off by a cart, without the necessity of resorting to the wheelbarrow, except it be in cleaning the cow and calf pens.

The thrashing may be done in the most economical manner, according to the directions given in the description of the first design.

There are over 3,000 square feet of surface on the roof, and about 2,000 barrels of water fall annually upon it, in the form of rain, affording five or six barrels daily for watering cattle, if watered by it all the year round. The cisterns should, therefore, hold not less than 500 barrels. (This size will not be needed, if there are other supplies of water—or if the herd is not large enough to consume so much.) If these are each twenty-five feet long and six feet wide, they will hold this amount. They should be well built, of masonry and water-lime, and arched over the top like a stone culvert, so that there will never be danger of the embankment falling in. A good well in the middle of the passage, with a pump, would obviate the necessity of these cisterns.

The cost of this barn, built with rough boards, would be about $800 or $900 ; planed and painted, $1,100 to $1,200.

ENLARGEMENT OF THIS PLAN.

It will be observed that by increasing the length of this barn, accommodations may be procured for any additional amount of land. If more room for hay is desired, the bay or a part of it may extend down into the basement ; and it may be two feet wider. Or, two rows of cattle stalls may be placed so as to run across the basement, from the root cellar to the front. Or, by building it between two slight elevations of land at the ends, the basement may open on both sides.

All the principal doors should be hung on rollers, and they will never cause annoyance by swinging about in the wind, and require no room for opening and shutting.

STABLE DETAILS.

Details for the construction of stalls are given in the REGISTER for 1860, or in RURAL AFFAIRS, p. 285 of vol. 2. For those who do not desire their cattle to occupy stables all the time, and especially for such as have a well protected shed, the following mode of constructing stalls, copied from the COUNTRY GENTLEMAN, may be valuable. "This plan consists of a series of *open stalls*, as they are called, constructed as shown in the engraving, in two rows, face to face—perhaps ten or twelve stalls, or even more, in each row—with a wide manger or feeding-way between, into which the fodder or meal, or whatever the cattle have, is admitted from above, the ends open by movable boarding, so that it may be swept out if occasion requires. These stalls are too narrow for the animal to lie down in at all, and each goes out and in at pleasure. The floor slopes about two inches from the head backward, and in going out and in, the animal cleans out its own droppings, so that no labor is required in this respect. The triangular space through which they put their heads into the manger, is too small to admit of their getting their feet into it, while, by the projection of the side of the stall 15 or 16 inches into the manger, they are completely prevented from interfering with one another, as regards the head and horns. The cattle are never tied in the stall.

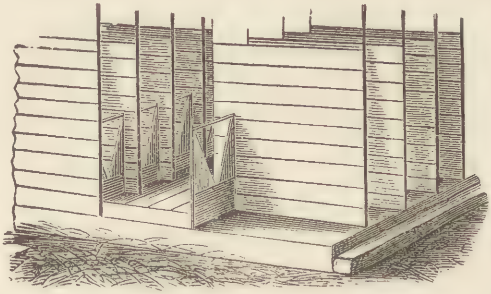


Fig. 15—STALLS FOR COWS, OR STEERS OF MEDIUM SIZE.

DIMENSIONS.—Partitions between stalls—3-inch scantling, boarded on each side—distance apart, 2 feet 10 inches from center to center.

Length of stall, 5 ft. 6 in. to the manger—side of stall projects into manger 1 ft. 4 in.

Manger—6 ft. 6 in. wide from center to center—1 ft. 11 in. high on outside—1 ft. 1 in. high on inside.

Floor—16 to 18 inches high from ground—with step—slopes about 2 inches backward from manger.

In the engraving, the end is taken out of the manger to show the heads of the opposite stalls, and the first stall at the right hand is represented without siding—the triangular space through which the cattle insert their heads into the manger is 4½ inches wide at the bottom, instead of coming quite to a point, as might be inferred from the cut.

DIMENSIONS OF SIMILAR STALLS FOR CALVES.—Width of stalls, 2 feet, center to center—length, 4 feet 4 inches to manger—width of manger, 4 feet from side to side—height of manger outside, 20 inches; inside, 12 inches—sides of stall project 11 inches into manger, to keep each animal's feed separate when so desired.

An aperture in the floor above corresponds in width with the manger, through which hay, &c., is put down for the use of the cattle.

The first objection urged against this system before one sees its operation, is that the cattle in the stalls would be injured by others "hooking" them, and some have said that no printed description of the open stall would convince any man that such would not be the case. The truth is, however, that *the elevation of the stall floor*, 16 to 18 inches above the ground, a stick of timber or other step being provided, as shown in the above cut—prevents this hooking, because the animal outside, to get at the one inside, must put its fore feet upon the step, thus raising the head entirely out of the downward position in which it must always be put for "hooking" purposes.

The advantages of the system, are the material saving of labor effected in feeding and cleaning out, as compared with other stalls; and, as compared with feeding boxes, in the fact that each animal is protected in obtaining all it wants, and "underlings," instead of being forced to eat the scanty leavings of the stronger beasts, have an equal chance at the first and best. Indeed, when the cattle get to running around and annoying one another, the weaker will go into these stalls for protection at once. The system is thought more healthy also, because water troughs are kept close by the stalls, and the animals while at their food are seen to come out at intervals for a drink, and return to the manger; while it is noticed on the old plan of taking them out to water at night and morning, that after a night's abstinence and a dry feed with daylight, they will fill themselves so full of the almost freezing liquid as

to chill the whole system, and perhaps prevent their drinking much when again taken out at a later hour. They would then really have but one long drink during the twenty-four hours, and it is easy to see that this cannot be as natural or healthy as it is to leave them free to quench their thirst before it becomes immoderate, and as often as Nature may dictate. Salt is also kept within their reach, as well as water; the floor is littered whenever necessary, perhaps twice a week; the manure from the horses comes down into the same place, and not a drop or an atom of the whole is lost."

A difference of opinion prevails among good farmers, as to the comparative advantages of stabling cattle and allowing them to run loose under a well protected cover. There is but little utility in a shed, with the wind sweeping freely under the sill, or blowing into its open side from the opposite direction. On the other hand, the benefits of stabling are greatly diminished by foul air and want of general cleanliness. The advocates of sheds have probably derived their dislike to stables by seeing animals breathing fumes from unremoved manure, or lying on wet and dirty straw. Those who prefer stables may not have given sufficient credit to a spacious, deep, perfectly sheltered shed.

One of the best of these that we have seen, occupied the whole of the barn basement, opening from prevailing winds, and the yard in front was flanked by high fences. More room is thus required for a given number of cattle, and they probably consume rather more food, thus partially exposed, than if entirely shut in; but they did not need the constant attention required to keep stables in a condition of perfect cleanliness. The feeding stalls just described, would be a valuable appendage to such a shed, and by protecting the smaller animals, admit of a larger herd for the same space or accommodations.

DESIGN III.

A LARGE THREE-STORY BARN.

A three-story barn can be erected only on a hill-side. The descent, however, should be very moderate—not to exceed ten feet in forty or fifty. A steeper descent will make a slippery cattle-yard. The natural rise on the higher side of the barn should be about equal to the height of the basement on that side; an embankment of eight or nine feet more, including abutment and bridge, will give easy access to the upper floor.

Barns with three stories are the best for saving labor. The hay is mostly pitched downward. The straw, when thrashed, is thrown downwards through shoots, or down on the tops of stacks, out the back door. Grain from the fanning mill runs down through trap-doors into the granary bins; or is drawn off through tubes, for feeding horses and cattle below.

The barn here represented is 42 feet wide, and 104 feet long. It will hold over 150 tons of hay, or a corresponding proportion of grain; stable eight horses, and nearly forty head of cattle. It will consequently furnish accom-

Fig. 16.—Large Three Story Barn.

modations for a good farm of about 150 arable acres. Some poor and badly cultivated farms of twice this size would not fill it.

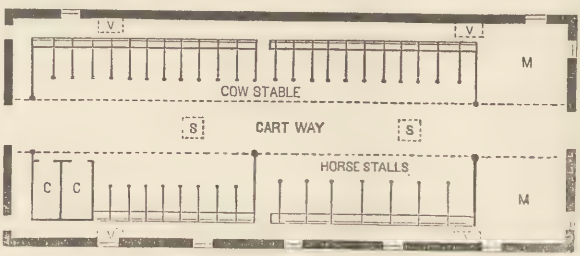


Fig. 17—Basement—First Plan.

C. C. Calf pens. M. M. Manure heaps. S. S. Places where shoots from above discharge straw for litter. V. V. V. V. Places of ventilators above, through which hay is discharged for feeding.

Two plans are furnished for the basement. The first, fig. 17, is mostly occupied with stalls; eight of which, the driest and most remote from the damp walls, are for horses. To prevent all dampness, they should be well floored, well drained, properly littered, and perfectly ventilated. The rest are cattle stalls. If stanchions are employed to secure the cattle, the whole may be set free, and again fastened, by the single movement of a rod extending the whole length, and attached to each moveable bar. If the cattle always find their feed on returning to the stalls, they will always readily take

their places in order, on admission to the stable. Hay from above is thrown down through the shafts V. V., and straw for litter through S. S. The cart-way extending through the middle, affords easy cleaning of the stables; and the manure thus collected, amounting to two large loads daily, may be drawn directly to the land, or to the compost heap; or it may be deposited in large square heaps at M. M. This barn is supposed to be erected on a farm where roots are not raised; but if room for them is needed, a root cellar may be made at M., reducing, if necessary, the length of the corresponding range of cow-stalls.

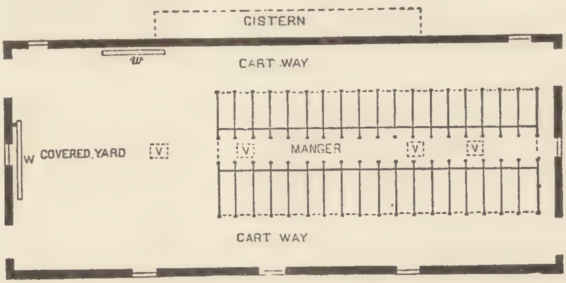


Fig. 18—Basement—Second Plan.

W. Water trough, fed by pump from well. w. is the place for water trough if fed by stop-cock from cistern under bank. V. V. V. V. Places where hay and straw are thrown down from above.

The second plan of the basement is adapted to the kind of feeding stalls shown in fig. 15, on a former page, leaving a covered yard or space for loose cattle 40 feet square, and two passages wide enough for carting away daily the manure. If this plan is adopted, the places for discharging hay from above are changed to suit this plan, as will be soon explained. If a well is used for watering the cattle, the trough may be placed at W. If a cistern, this may be built under the bank, outside the walls, and be made of stone and cement, of an oblong form, arched overhead, like a culvert, so as to be secure from ever breaking it, when trodden upon by horses above. Fig. 19 is a cross section of this cistern, showing the slope of its bottom, for completely drawing off all the water, through the stop-cock or faucet. Such a cistern, fifty feet long and six feet wide, will hold about five hundred barrels of water.

Fig. 19.
Section of Cistern.

To accommodate sheep, pens, like the calf pens C. C. in the first plan, may be added in the same range; or the covered yard in the second plan may be partly devoted to this purpose.

The floor or story next above the basement, fig. 20, may be about eight or nine feet high. The large carriage room will contain several vehicles, which may be run around the central bay and passed easily out the other door. A

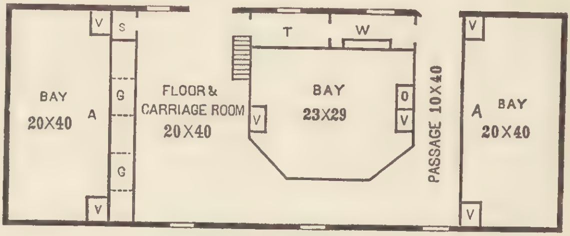


Fig. 20—Floor above Basement.

G. G. Granary. S. Saddle room. T. Coarse tools. W. Workshop and bench. V. V. V. V. Ventilators and hay dischargers. A. A. Place for ventilators when Second Plan of Basement is adopted. O. Bin or reservoir of oats, for horses below.

load of grain from the granary, G., may be readily loaded and drawn out by entering at the last named door. The bottom of the bins of the granary, (which are about five feet wide,) should be nearly a foot high in front, so as to admit a half bushel under the spout, and they should be two and a half feet higher at the back, by which all the grain may be drawn off by merely raising the slide. As they extend up to the upper story, and are filled from above, this space beneath them is not needed.

Fig. 21.

O. is a bin for oats, directly over the horse stable, filled through the trap door above, and communicating with the stable by the self-feeding discharger, fig. 21, which may have a cover and be locked. The bottom of the oats bin should be hopper shaped, that all may be drawn off. If the bottom has a slope of one foot in two, the grain will all slide out freely.

It will be found usually most convenient to fill the lower parts of all the bays with hay, and then the grain above. This will render the grain accessible to the upper or thrashing floor. But if much hay cannot be cut so early, the bays should be at least filled as high as the thrashing floors, before unthrashed grain is deposited. The central bay may be used for storing straw, if the first plan of the basement is adopted, and it is readily discharged at the points S. S., fig. 17. (For one or two story barns, sixteen feet is as great a width for bays as is entirely convenient for filling; but as a large por-

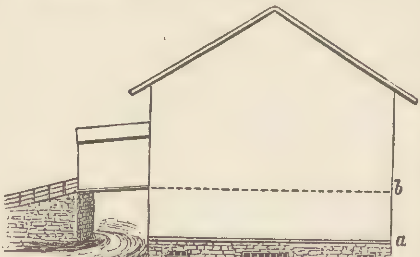


Fig. 22—End View of Large Three-Story Barn.
a. Granary floor. b. Thrashing floor.

tion of the hay is thrown downward, in one of three stories, the bays may be eighteen or even twenty feet wide.)

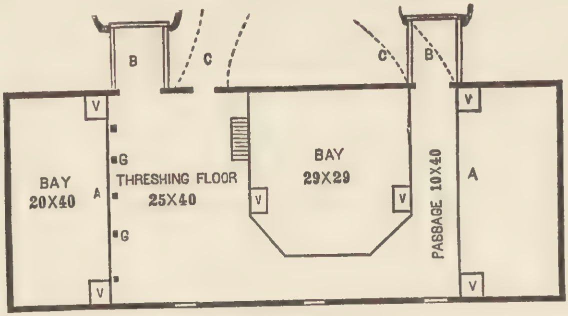


Fig. 23—Upper Floor.

G. G. Trap doors to granary. V. V. V. V. Ventilators. A. A. Place for ventilators for Second Plan of Basement. B. B. Bridges from abutments to upper floor. C. Carriage way between abutments, to floor below.

The upper floor, fig. 23, reached through the covered bridges, shown in the section, fig. 22, receives every load of hay and grain, for deposite in the bays, and when the wagons are unloaded they are driven around and out at the other door. Two may be unloading at once, there being ample room for them to meet on the thrashing-floor.

It is intended to use a two-horse endless chain horse power, to do the thrashing, as this mode enables the farmer to do the work without any additional help, and especially during the comparatively leisure season of winter, and to keep a constant supply of fresh straw, where this is fed to animals.

The basement should be about nine feet high, the next story eight feet or more, and the upper may have sixteen feet posts additional.

The cost of this barn, well built and covered with rough boards, varying with localities and other circumstances, will be about $1,600. If planed and painted, it will exceed $2,000.

DESIGN IV.

A SMALL THREE-STORY BARN.

This is about one-third the capacity of the barn last described, being 34 by 56 feet. The basement, fig. 24, resembles in its general design, that of Design II., but being eight feet narrower, the calf-pen range is contracted to six feet wide, the feeding passage to four feet, and the shed to twelve feet. No further description of the basement will be necessary.

The next story above, fig. 25, is occupied with the bays at each end; the row of bins for grain, discharging by slides, as in the previous plan, a foot above the floor; a shoot, *v.*, for receiving straw for litter, and for covering

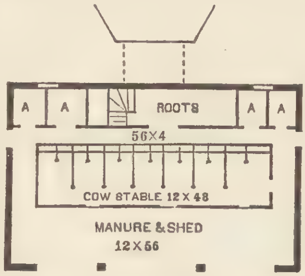


Fig. 24—BASEMENT.
A. A. Calf pens, 6 feet square.

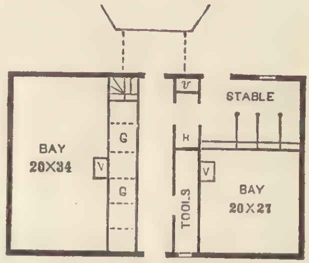


Fig. 25—MIDDLE FLOOR.
G. Granary. V. V. Ventilators and hay shoots. *v.* Shoot for straw.

the roots below as a protection from frost; harness, saddle, and buffalo room, H.; a tool room, arranged as shown in figs. 7 and 8; and a stable for horses, one of the stalls being 6½ feet wide, for driving in a team in harness. The other stalls are 4½ feet wide.

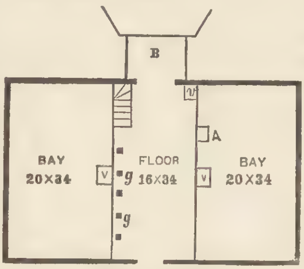


Fig. 26—UPPER STORY.
V. V. Ventilators and hay shoots. *v.* Shoot for straw. A. Shoot for hay to horse stable. B. Bridge from abutment to thrashing floor. g. g. Trap doors to granary.

The upper story, fig. 26, has a continuation of the bays; a thrashing floor, with trap doors at one side for filling the granaries below; the shoot, *v.*, for throwing down straw from the thrashing floor; and the one A. to supply the horse stable with hay. A door placed next the stable, in the shoot, *v.*, on a level with the horse stable, turns on hinges placed on its lower side, so that it may open inward, and in doing so, close up the shoot, that straw thrown down now will fall into the stable. This door, when allowed to fall open, rests in a sloping position, as shown by fig. 27, representing the door open, and fig. 28, the same as closed, and leaving a free passage for the straw to the basement.

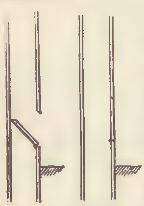


Fig. 27, Fig. 28.

This barn will hold over sixty tons of hay or unthrashed grain, stable five horses, eighteen cows, and store five or six hundred bushels of grain. It is a very complete barn for its size, and furnishes a great amount of accommodation for its cost, which is about $700 or $800, built rough, or $1,000 planed and painted.

As already suggested, a corn house should be separate from the barn, where any considerable quantity of corn is raised, that it may be freely ventilated

on every side. The reader is referred to a good design for such a building, on page 98 of second volume of Rural Affairs, altering it so as to omit most of the bins, and substituting their places with corn-crib room. Bins for other grain than shelled corn are more convenient in the barn where such grain is thrashed. The size of the building referred to may be therefore considerably reduced. The posts should raise it just sufficiently to drive a load of corn under, so that it may be thrown up through a low door at each end, by means of a scoop shovel, into the central passage, for sorting. These doors should hook inside.

A better mode of filling in some cases may be the following, in wet seasons. Place the corn-crib, when circumstances will allow, within twenty feet of a three-story barn. Draw in the corn as husked, dump it on the floor, assort it, and pass it down a sloping shoot, or ladder supporting a trough, into the corn-crib.

A well arranged piggery, which may also be a separate building, is figured and described on page 33 of the same volume of Rural Affairs.

VARIOUS DETAILS.

Drains for liquid manure, in basements, should be made of flagging or hard burned brick, and be wide enough on the flat bottom to admit a square shovel, for readily cleaning out manure that may have fallen in. There should be a slope from one end to the other, that the liquid portions may drain off, and this slope must be provided for when the barn is laid out. The liquid may run into a tank; but it will usually be most convenient to pump it from the tank frequently, on the manure heap. Where large quantities of litter can be always used, this will absorb most of the liquid portions, and obviate drains.

A small side-door, for entering the barn without the necessity of opening the large doors for simply passing in and out, will be a convenience.

The basement walls should be laid in a broad, deep trench, filled with stone, to effect thorough drainage.

In laying floors with a lining, a mixture of gas tar and air-slacked lime, or tar and fine sand, spread between the boards, will make them perfectly tight, and promote durability—or tar and lime in the cracks only, will be very useful.

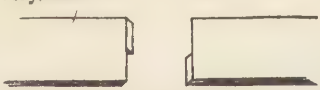


Fig. 29.

In laying matched floors, the ends of plank may be prevented from rising, by matching as shown in the cut, (fig. 29,) which is quickly done with a saw.

Fig. 30.

For splicing timbers and scantling, the mode shown by fig. 30 is an easy and good one, the parts being firmly spiked together.

Eave troughs should always

be constructed, either for supplying cisterns or for conveying the water away from the foundations, manure heaps, and cattle. The common tin scuppers are cheap and good.

Siding. The most commonly approved covering is vertical boarding and battens. Some good builders, however, prefer *double boarding*—the inner boards, round edged, being half an inch thick, and secured in their places by shingle nails, and the outside, three-fourths thick, put on at the same time, to break joints properly, and all well secured by twelve-penny nails.

A broad projecting roof adds much to the durability of the upper walls.

FORMS OF VEGETABLE GROWTH.

VEGETABLE PHYSIOLOGY:

OR, HOW PLANTS GROW.

A large share of the business of the farmer, gardener, and fruit culturist, is in connection with the growth of plants and trees; and it therefore becomes important that he should so understand the process as to know what will influence vegetation, or hasten it on one hand, and retard it on the other.

The formation of a giant tree from a minute seed, is one of the most interesting and wonderful occurrences in nature. But as vegetable growth is daily witnessed by every one, nothing is commonly thought of it; and many persons, if asked "How do plants grow?" may answer, "Why, it is *natural* that they should—that is the way they all do, unless they happen to be destroyed." This, however, is not an explanation of the process. Let us

therefore, take a brief glance at the successive stages of a plant or tree, and explain how it first springs from the minute embryo in the seed, and expands into leaves, branches and roots, gradually increasing in size until it reaches full maturity.

The whole process may be better understood by going back beyond the seed, and viewing the first formation of the embryo. If the flower of a plant is examined by means of a powerful microscope, the germ or central portion will be found to contain at first a little *vesicle* or bladder-like body, often so small that a hundred could lie upon the point of a pin. This is the very beginning of the plant—the earliest stage of its embryo existence. But it will never become any thing more than a grain of soft pulp, unless it is fertilized or acted upon by the pollen or dust from the anthers of the flowers. When thus fertilized, the little globule begins to expand, and soon assumes a distinct form.

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5.

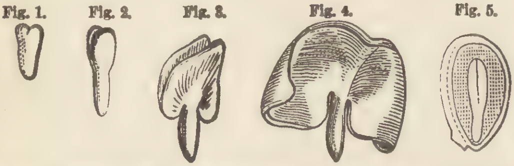


Fig. 1* represents the minute forming embryo or plantlet, in the young seed of the buckwheat, magnified by a microscope—the nick at the end shows the commencement of the little seed leaves; fig. 2 exhibits the same more advanced; fig. 3 shows the seed leaves distinctly formed; and fig. 4 the same as found in the full grown seed or grain. These seed leaves, as afterwards expanded in the growing plant, are familiar to every farmer, being the two first kidney-shaped leaves which appear above the soil in every young crop of buckwheat. The manner in which they are folded in the seed, is shown in fig. 5, which represents a moderately magnified grain cut through the middle.

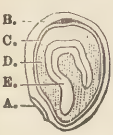


Fig. 6.

Seeds, when formed, consist of several parts. These are shown in fig. 6, which represents a slightly magnified section of the seed of the basswood. (The lines extending inwards from each letter point to the diffkrent parts.) The *hilum* or scar, being the mark left where the seed stalk separated, is at A.; B. the outer seed coat; C. the inner coat; D. the albumen or nourishing matter; and E. the plantlet or embryo of the young plant or tree.

The albumen is the nourishing matter, commonly surrounding the embryo, or in contact with it, destined to nourish the young plant when it begins to grow. It is the floury part of wheat, corn, and buckwheat, where it not only supplies nourishment to the young plant, when sown as seed, but to men and

* For most of the cuts illustrating this article, we are indebted to Prof. GRAY's admirable Introduction to Botany, and to the liberality of the publishers, IVISON & PHINNEY, of New-York.

animals, when ground into meal or flour. It is not always *mealy*. In poppy seeds it is oily; in the peony and barberry, it is fleshy; in coffee, it is horny. But it always becomes softened when the seeds begin to grow. The quantity varies in different seeds. Fig. 7, for example, is the section of a seed of the peony, filled with albumen and with a very small embryo near one end—fig. 8 is the embryo, separate, and magnified. Fig. 9 is a section of a barberry seed, and fig. 10 the detached embryo. Figs. 11 and 12 show the seed and embryo of a potato seed; and figs. 13 and 14, of the four-o'clock.

Fig. 7.

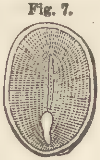



Fig. 9.

Fig. 11.

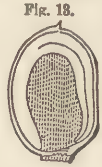
Fig. 13.



Fig. 8.

Fig. 10.

Fig. 12.

Fig. 14.

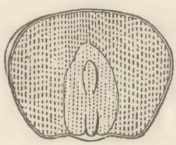


Fig. 15.

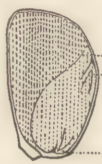



Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

Figs. 15, 16 and 17, are slightly magnified views of a cut grain of Indian corn, the first cut the longest way, showing the embryo, lying against the albumen, which constitutes most of the grain; the next, cut across; and the third, the embryo detached.

There are many kinds of seed that have no separate deposites of albumen for nourishing the young germinating plant, but this nourishment is afforded by the thick seed-leaves of the embryo itself, as in the maple, the apple, the bean, and pumpkin. Fig. 18 shows an apple seed cut through the middle lengthwise, showing the small embryo, with its larger seed leaves above. Fig. 19 shows the embryo and seed leaves taken out. In the peach, almond, chestnut, and horse-chestnut, these seed leaves are still larger and more fleshy and supply much food to the young plant.

The word *kernel* is usually applied to the whole of the seed within the coats, whether it is all embryo, or a large part albumen.

GERMINATION.

The first movement of the seed towards forming a new plant is termed *germination*. After the plant is formed, and its growth is carried on through

the agency of its leaves, the process is termed *vegetation;* the latter immediately following the former.

To produce germination, seeds require heat, moisture and air, but not light. It will be observed that these three requisites are present when seeds are slightly buried in moist, warm, mellow earth. Heat, although essential to all seeds, varies in the required degree, with different species. The chickweed, for instance, will vegetate nearly down to the freezing point; while tropical or hot-house plants often need a blood heat. Nearly every person has seen frequent proofs of the necessity of moisture to cause seeds to germinate—indicated by the practice of watering newly sown beds. The farmer knows that wheat sown in a very dry soil may not come up. The florist is aware that minute seed, which cannot be planted deep, as the portulacca, must be kept moist by a thin covering or shading. It is often requisite to bury seeds to a considerable depth, in order to secure a proper degree of moisture to start them. It is not unusual to see uncovered grains of wheat or corn sprouting and growing in long continued rains, which also sometimes ruin crops of wheat left exposed in the sheaf, or even in the field uncut.

The third requisite, *air*, is an important one. Seeds may be kept dormant a long time by deep burying. Nurserymen have often retained the vitality of peach stones for a year or two, by burying them a foot or more in compact earth. Other seed might doubtless be kept for a time in the same way. Planting too deep is often fatal to the success of a crop. The seeds of noxious weeds remain many years buried beneath the soil, until cultivation brings them up, mixes them with the soft mellow surface, accessible to air, when they spring up in profusion over the ground. Many of the seed are quite minute, and not occupying a ten-thousandth part of the soil in which they lie, their presence cannot be detected. Hence some persons, ignorant of the laws of vegetable growth, erroneously suppose that weeds spring up spontaneously, or without seed, a thing which has probably not occurred since the creation of vegetable growth. For example, of the seed of the chess plant, about two million are required for half a cubic foot; yet a single grain to each square foot of soil would produce a heavy crop, if all the wheat with which it is sown were killed, so as to give room for it to grow. Hence, only a two-millionth part of the bulk of the soil in chess seed, may produce a crop. Other seed are much smaller, and the disparity more striking.

In order to produce germination, moisture must find ready access to the the interior of the seed. It is often excluded with some seeds, if the coats have been allowed to become too dry. The thick coverings of the chestnut, horse-chestnut, and many seeds of similar character, if left a few days exposed to the air, become so hard as to prevent it. To secure success, they must be kept moist by imbedding them in moist sand, leaf mold, or moss, from the moment they separate from the tree, until planted in the earth. Apple and some other seeds, which have been allowed to become too dry, may frequently be started by scalding and then exposing to the action of the frost, and by

repeating the process several times, there is greater certainty of germinating. As the scalding and cooling must be quickly done, portions not larger than two or three pounds should be taken at a time. The object in cracking peach and plum stones before planting, is to admit air and moisture—a process which is also hastened by subjecting to freezing and thawing.

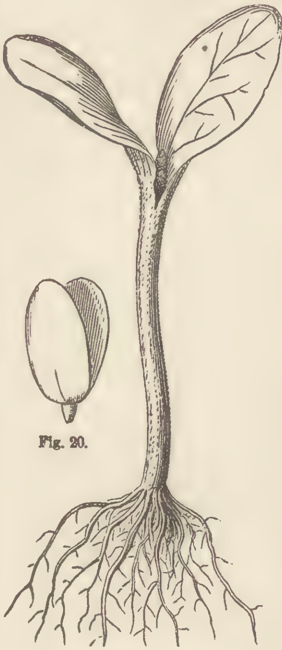


Fig. 20.

Fig. 21.

Process of Germinating. Moisture and heat produce chemical changes in the fleshy part of the seed. The embryo immediately begins to expand. The result may be seen in various examples, one of which is represented in the annexed figure, (fig. 20), which represents the embryo of the pumpkin, taken from the seed, by simply removing the coats. The little projection at the lower end is the part that afterwards becomes the stem, and is commonly called the *radicle*, because it was formerly supposed to be the little root. It would be more correct to call it the *stemlet*, because the new roots shoot out from its lower end, and the seed-leaves or *cotyledons* expand with green leaves above, as soon as the stemlet has become long enough to thrust the seed-leaves out of the ground, as is shown in fig. 21, which is the young pumpkin plant as soon as it has come up. It will be seen that the stemlet of the seed has here become more than twenty times its original length; and if the seed are planted very deep it will stretch itself up much longer, in its effort to thrust the cotyledons up to the light. The young seed-leaves furnish nourishment to the new plant, until perfect leaves are formed from the bud between. The bean is more fleshy than the pumpkin, and its cotyledons do not become leaves, but only supply nourishment until leaves are formed. It will be now seen why destroying the cotyledons before new leaves are formed, (as by insects,) destroys the plant itself, by cutting off its supply of nourishment. Fig. 22 is the embryo of the bean; fig. 23 is the young plant as soon as up; and fig. 24 the same more advanced. The apple, pear, cherry, and many other trees, push their seed leaves to the surface of the ground; but in the pea, the oak, the peach, and others, they remain beneath the soil, and simply supply nourishment to the young plant, without performing at all the office of leaves, as is done in the pumpkin, maple, &c. Figs. 25 and 26, show the germination of the pea; figs. 27 and 28, that of the oak. In these

instances, the cotyledons are so fleshy as to afford all the needed food for growth, without assuming the office which leaves usually perform.

One-Cotyledoned Plants. In the cases already given, the seed have two cotyledons or seed-leaves. By far the larger portion of all plants, and all trees with scarcely an exception, growing in the Northern States, are two-cotyledoned. There are, however, many herbaceous plants, and among them wheat, corn, oats,


Fig. 23

Fig. 24. Fig. 28.


Fig. 25.

Fig. 26.

barley, broom-corn, and all the grasses, which are one-cotyledoned. These two great divisions are readily distinguished from each other by a single glance at the leaves. If the veins of the leaves ramify or branch into many smaller veins, like net-work, as shown in the annexed representation of a quince leaf, (fig. 29,) they nearly always belong to the two-cotyledoned class of plants. If, on the other hand, these do not branch, but are parallel-veined, or *nerved*, as in the lily, (fig. 30,) they commonly belong to the one-cotyledoned class. Every observing person has seen that the leaves of the

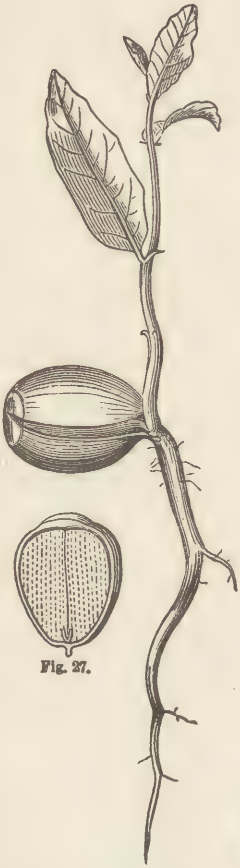


Fig. 29.

Fig. 27.

Fig. 28. Fig. 30. Fig. 31.

Indian corn, flag, grass, lily, &c., have only parallel veins or nerves; while those of the maple, beach, cherry, melon, buckwheat, pig-weed, thistle, and many others, have finely branching veins.

There is another striking distinction between these two classes of plants.

Two-cotyledoned trees grow by successive annual layers formed on the outside, which are the successive rings or circles by which the age of the tree is known when cut across. But one-cotyledoned trees grow from the inside and expand outwards, as in the palm and cocoa-nut tree. In the latter there is no distinct and separate bark; in the former the bark is distinct, and generally separates easily. In the corn-stalk, for example, no bark is found; in the hemp, flax, &c., it is easily removed, and becomes an important substance. The first are called endogenous, or inside growers; and the latter exogenous or outside growers.


Fig. 32.

Figs. 16, 17 and 18, on page 146, in this article, show the single cotyledon of the grain of corn, containing inside the bud of a new leaf. Fig. 31 shows the grain of corn after germination has commenced, and fig. 32 exhibits the same more advanced.

As soon as the growth of the seed commences, the stem tends to push upwards to the light, and the root thrusts itself downwards into the darker parts of the earth; they immediately extend away from each other in opposite directions. If the seed at this time be turned over, so as to reverse their position, they will immediately bend, and each assume its proper direction, no matter how many times this adverse process or turning is repeated. The stem, growing upward, sends out numerous branches from its buds. The root, running downwards, branches more irregularly below, and without any buds. The growth of the plant or tree having now fairly commenced, it may be well to describe briefly how the process is carried on, before pointing out minutely the structure of each organ or part.

Mode of Growth. The sap enters the plant by the small thread-like fibres of the roots, and passes from these into the larger roots, and into the stem. From the stem it is sent into all the branches, and to the extremities of the smallest shoots. Passing through the leaf-stalks, it is spread out by minute veins all over the leaves, where it is exposed to light and air. Much of the water of the sap is here evaporated, at the same time that it receives carbonic acid from the air, and a new and thickened substance is formed, which now gradually descends, not through the sap wood by which it came up, but through the inner bark; and as it descends it deposites a coating of the new soft wood on the outside of

last years' wood, thus forming a new growth. This is the ordinary mode in which all exogenous or two-cotyledoned plants grow and increase in size. With this brief explanation, it may now be proper to describe more minutely,

The Structure of the Plant or Tree. All plants, in the first place, are manufactured or built up of innumerable little cells, sacs, or cavities. These are usually not over a five-hundredth part of an inch in diameter, and in many plants they are still smaller. The original ovule is a single cell; when impregnated by the pollen, it immediately begins to increase by the addition of new cells, which it appears to have the power to form; and thus by successive additions, like the building of a house of bricks, it becomes a large growing plant or tree. Fig. 33 represents a greatly magnified single cell; fig. 34, a large number together, as they usually exist in the plant. In the woody part of a tree, these cells become thickened and hardened, and drawn out as seen in fig. 35, which shows the magnified wood of the buttonwood. They are often irregularly placed together, and small *ducts* or air tubes are interposed between them. Fig. 36 exhibits a small part of the young shoot of the peach, cut across—the whole shoot presenting at least 10,000 of these little vessels, only visible under a good microscope. The branch of an apple tree, an inch in diameter, shows about one million. This cellular structure exists throughout the roots, stems, shoots, leaves, flowers, and fruit.

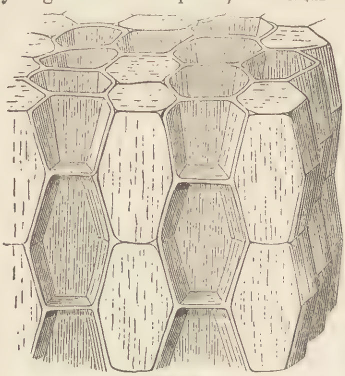


Fig. 34.

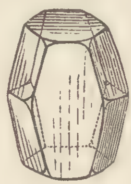


Fig. 33.

Fig. 36.

Fig. 35.

The cells of plants usually vary from 1–300th to 1–500th of an inch in diameter, and it is obvious that during vigorous growth the plant must form them with great rapidity. A shoot of asparagus increases the length of one cell every ten seconds, and as its diameter embraces many thousands, from fifty to a hundred million are formed every day. The building up of the

plant of these cells has been compared to the erection of a house by the successive addition of bricks; but if as many bricks were daily added to a structure, they would be enough to make a building daily larger than the great pyramid of Egypt, or the Colliseum at Rome. Yet every one of these cells is as perfect and finished as the finest work of art.

THE ROOT.

The root consists of several parts. The *main* root, also called the *tap* root, is the large central portion, extending directly downwards; the *lateral* roots are subdivisions or branches of the main root; the *fibres* are the small thread-like roots proceeding from the laterals; and the *spongioles* or *spongelets*, are the porous and spongy extremities of the fibres, when they are extending in length, and through which they receive much of the sap from the soil. Fig. 37 is a greatly magnified section of a spongelet.

Fig. 37.

The *collar* is the point of union between the root and the stem, but its place may be easily changed in many young plants by banking up the stem, which will emit new roots above. Or, a branch may be buried, as in the formation of a new plant by layering, as in the case of grapevines, honeysuckles, gooseberries, and many other woody plants. Small portions of roots attached to a graft will often produce a new plant; this is especially the case with the grape and rose, which are now extensively propagated in this way; and also in some degree with the apple, which, however, when thus root-grafted, larger portions should be employed of the roots of one-year, or at most two-year seedlings. Nearly all trees and shrubs will produce new plants by layers, if young shoots are selected that have soft green bark, through which the new roots are easily emitted, fig. 38. When the roots do not readily strike through the bark, the process may be hastened by splitting, as in fig. 39.

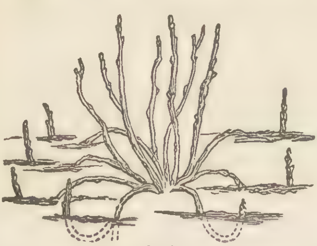


Fig. 38.

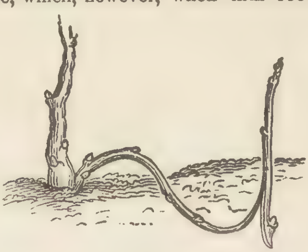


Fig. 39.

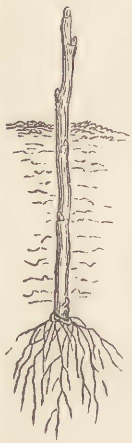


Fig. 40.

Some plants strike roots readily in open air from *cuttings*, partly buried in soil. This is especially the case with the grape, currant, gooseberry, quince, and running roses, fig. 40. They are usually taken from the parent plant after it has ceased growing, and they should be compactly imbedded in the soil with a small portion of the upper extremity uncovered. When long, like the grape, they should be placed sloping, so as not to be buried too deep or beyond the influence of the sun's warmth; at the same time the moisture of the soil is often beneficially preserved by a thin surface coating of fine manure. There are many other plants easily propagated by cuttings, if the two great requisites of vegetation, namely, moisture and warmth, are increased by artificial means, as in a hot-bed under glass; or in a propagating-house, under sash, or bell glasses, with fire heat gently applied beneath.

Roots which throw up suckers readily, may be rapidly increased by planting small cuttings or pieces of the roots, in a warm, moist soil, especially if artificial heat and covering be given. Nurserymen have increased raspberries and blackberries in this way in great numbers.

Transplanting. Very few fruit or ornamental trees ever remain where they first came up from seed, but nearly all are removed one or more times, to the spot where they are finally to remain. For this reason, transplanting becomes a most important operation. If a tree could be removed with all its roots, including the numerous thread-like radicles, and all the spongelets, and placed compactly in the soil, precisely as it stood before, it would suffer no check in growth. The nearer we can approach this condition, therefore, the greater will be our success.

As a general rule, roots extend as far on each side of the tree as the height of the tree itself, or nearly so. If, for instance, a tree be five feet high, the roots will be found to extend five feet on each side, or to form a circle ten feet in diameter. Great care would be required, however, to detect the minute fibres so far. This rule will not apply to slender trees, which have become tall by close planting, but to those that are healthy and well-developed. The great length of the roots is often shown by trees which send up many suckers, as the silver poplar and locust, which may be seen to extend over a circle much greater than the height of the tree.

Many persons "wonder" why trees are so much checked in growth by transplanting, or why they so often die from the operation. They would not be surprised, if they saw all the usual destruction of roots in taking them up. Fig. 41 represents a nursery tree with its roots entire; the dotted lines show where the spade is commonly set for the purpose of lifting; fig. 42 is the tree after taken up, when more than nine-tenths of the roots are cut off—

Fig. 42. Fig. 43. Fig. 41. Fig. 44.

sometimes it is as badly mutilated as in fig. 43. Fig. 44 exhibits the same as removed by careful nurserymen. As it is impossible, in ordinary practice, to secure all the roots, there must be a corresponding shortening back of the shoots at the top, when the tree is set out, in order that the reduced quantity of roots may have no more buds and branches to supply with sap than they can sustain.

On page 180 of the 2d volume of "Rural Affairs," the necessity of cultivating the whole surface of orchards and fruit gardens is distinctly shown—the roots rapidly extending through the soil and meeting, so that in a few years a young and well cultivated orchard will cover all the ground beneath the surface with one continued network of roots and fibres. The fallacy of the practice of spading small circles around trees is obvious, as the great mass of the roots extend far beyond. Manuring the foot of the stem only, which is often done, is equally useless.

Practice has fully proved the importance of keeping the whole surface of the ground clean and mellow, where young orchards or plantations of trees are set out. A mere surface covering of thin grass has been found to retard and almost wholly prevent growth. A young peach tree, growing in grass, will not make a shoot more than three or four inches long. Well cultivated, it will grow three or four feet.

THE STEM AND BRANCHES.

As roots are *annual*, *biennial*, or *perennial*, as they continue living *one*, *two*, or *more* seasons; so the stem is *herbaceous* or *woody*, as it grows only one year or more—in the latter instance hardening into wood. A perennial root may have an annual or herbaceous stem, as the peony and lily. Woody plants, when small, are called *shrubs*, as the rose, honeysuckle, and lilac, or the gooseberry and currant. When large, they are trees, as the apple, the pine, and the oak. A dwarf apple, made small by budding any common

variety on the small Paradise stock, becomes a shrub. Stems are *twining*, as in the morning glory or bean; and each twining species always turns to the right, or to the left, and never changes, and nothing can make them twine in a different direction from their natural course. They are *climbing*, as in the grape vine and pea; *creeping*, as in the white clover. What are termed

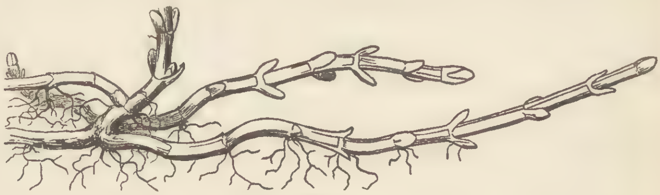


Fig. 45.

creeping roots, as in the Scotch rose, the couch grass, or peppermint, (fig. 45,) are only creeping stems beneath the surface. Sometimes such stems become enlarged at the growing ends, and produce *tubers*, as in the potato, which is nothing but a thickened subterranean stem, the *eyes* being the *buds*. *Suckers* are branches springing up from underground stems; sometimes they come from mutilated roots. Runners are creeping stems, which strike roots at the tips and form leaves there, as in the strawberry. A single strawberry plant will in this way produce a hundred new ones or more in a single summer, and by care ten thousand by the end of the second year, a million the third, and so on. A *bulb* is a very short subterranean stem, with roots beneath, and throwing out leaves above, as the onion, tulip, and lily. Or, it may be regarded as a bud only, with roots and a thick fleshy covering.

Outside-growing woody stems, (or those which are two-cotyledoned,) are made up of the bark, wood, and pith. The *liber*, or inner bark, lies next the wood; and the rind or outer bark, on some trees, forms gradually into a thick, hard, corky substance, termed *cortical layers*. When young it is the *green bark*, and performs the same office in the growing plant as the leaves. The sap descends from the leaves through the inner bark, and deposites new layers of both wood and bark yearly. Thus the newest bark is inside, and the newest wood outside. The liber forms the *bast* or bass matting, obtained from basswood by soaking in water; and in flax and hemp, herbaceous plants, it constitutes the material made into cordage.

Wood. The outer wood, which is the youngest and freshest, is called the alburnum or sap wood—through this, the sap ascends into the leaves. The heart wood is the older, harder, and usually more dried portion; and it bears the same relation to the sap wood, as the cortical layers do to the liber. The *pith*, in young plants, holds a useful place for retaining moisture; but in old trees it becomes dry, shriveled, and useless, and trees grow as well where it has been cut out.

Branches. These consist of *main branches* or limbs; *secondary* or

smaller branches; and *shoots*, or the extremities, being one year's growth. *Thorns* are a modification of branches, and are sometimes simple, as in the common thorn; or branched, as in the honey locust. Ungrafted pear trees often present all the intermediate forms between perfect branches and perfect thorns. *Prickles* grow only from the bark, and when the bark is stripped off they are all taken off with it, but thorns remain attached to the wood.

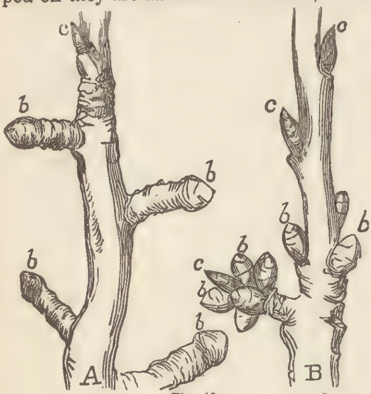


Fig. 46.

Buds are of two kinds, *leaf* and *flower*. The former grow into branches, the latter produce fruit. To distinguish these buds is of great importance to the cultivator of fruit trees. In fig. 46, A. represents a portion of the branch of a pear tree, and *b. b. b.* are flower or fruit buds on the extremities of short spurs termed fruit spurs; and *c.* is a leaf bud on a one-year shoot. B. exhibits these two kinds of buds as seen on the cherry, *b. b.* being the rounded fruit buds, and *c. c.* the sharper leaf buds.

Causes of this difference.—When young trees grow rapidly, all their buds are leaf buds; when they become older and grow more feebly, many of them become flower or fruit buds. One is the result of rapid, and the other of slow growth. Check the growth of a young tree by transplanting it, or by root-pruning, or by neglecting cultivation, or allowing it to grow with grass, and many fruit buds will be found upon it, and it will bear early. But as the growth is unnaturally enfeebled, the fruit is not always of the best quality. The natural diminution of vigor from increased age furnishes better fruit. Fruit buds are likewise produced by checking the free flow of the sap in grafting on dissimilar stocks, as for example the pear on the quince, producing dwarf pear trees. The fruit spurs shown by A., fig. 46, are nothing more than stunted shoots, originally produced from leaf buds, but which, making little growth, have become fruit bearers. The vigorous one-year shoot of the cherry, B., is mostly supplied with leaf buds, but the short spurs on the second year's wood, which are but dwarfed branches, are covered with fruit buds, with only a leaf bud in the centre.

It is not, however, always the slowest growing kinds of fruit trees that bear soonest. There appears to be a constitutional peculiarity, with different sorts, that controls the time of beginning to bear. The Bartlett, Julienne, and Howell pears, vigorous growers, bear much sooner than the Dix and Tyson, which are less vigorous.

By pruning away a part of the leaf buds, the fruitfulness of a tree may be increased; and by pruning away the fruit spurs, bearing may be prevented, and more vigor thrown into the shoots.

Buds are *lateral*, when on the side of a shoot; and *terminal*, when on the end. Terminal buds are nearly always leaf buds, and usually being larger and stronger than others, make stronger shoots. All buds are originally formed as leaf buds, but the more feeble are generally changed to fruit buds. Now, it happens that on many kinds of trees, the feebler buds are on the lower parts of shoots, (by *lower* is meant furthest from the tip,) and these consequently often change to fruit buds. This change in some kinds of trees, as cherry and plum, takes place the year after they are formed; and in others the same year, as for instance in the peach and apricot.—This transformation is a very curious process, and is effected by the embryo leaves changing to the organs of the flowers. A contrary change of stamens to flower leaves produces double flowers. Fig. 50 represents all the different gradations of such a change, from perfect stamens to perfect petals, as occurring in the Nymphæa or Pond lily.

Fig. 47.

Latent Buds. Only a small proportion of all the buds formed, grow the second year; the rest remain dormant or latent for years, and are made to grow and produce shoots only when the others are destroyed.

Adventitious Buds are produced by some trees irregularly any where on the surface of the wood, especially where it has been mutilated or injured; and they form on the roots of some trees which are cut or wounded. In these cases such trees may be usually propagated by cuttings of the roots.

Leaves. These are usually made up of two principal parts, viz: the *framework*, consisting of the leaf-stalk, ribs, and veins, for strengthening the leaf, and supplying it with sap; and the *green pulp*, which fills these meshes or interstices. The whole is covered by a thin skin or *epidermis.* The green pulp consists of cells of various forms, with many air-spaces between. The cells are commonly placed very compactly together on the upper side of the leaf, and more loosely, or with air-spaces, on the lower side—hence the reason

that leaves are usually lighter colored below. Fig. 48 is a highly magnified section of a leaf, showing the green cells, air spaces, and epidermis above and below. Leaves have also *breathing pores*, through which moisture and air are absorbed, and vapor given off. They are so small as to require good microscopes to discover them; and they vary in different plants from 1,000 to 170,000 on a square inch of surface. The apple and pear have about 25,000 or 30,000, and the white lily about 60,000 to the square inch. They are mostly on the lower side of the leaf. Fig. 49 represents the pores on an apple leaf. Leaves are a contrivance for increasing the surface exposed to the air and sun. Prof. Gray says the Washington elm at Cambridge was estimated to bear "seven million leaves, exposing a surface of 200,000 square feet, or about five acres of foliage." A common fully grown apple tree has from three to five hundred thousand leaves, and the breathing pores they all contain must be more than a thousand million.

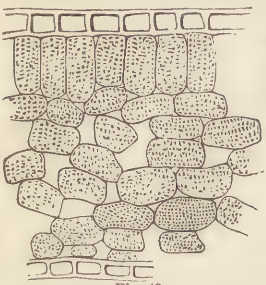


Fig. 48.

Fig. 49.

THE PROCESS OF GROWING.

Water is absorbed by the roots, and undergoes a very slight change; matter from the cells of the root is added, (as sugar, in the maple,) and it is then denominated *sap*. It passes from cell to cell upward, through the sap-wood, until it reaches the leaves. The cells being separate, and not continuous tubes, it is conveyed from one to another through a great number of partitions; in the basswood, for example, which has very long cells, it passes about 2,000 partitions in rising a foot.

When the sap enters the leaf, it emerges from the dark cells through which it has been passing, and is spread out to the light of the sun. A large portion is evaporated through the breathing pores, and it becomes thickened. The carbonic acid of the air, and the small portion of the same acid which the sap contained before it entered the roots, now forms a combination with the oxygen and hydrogen of the sap, and produces the triple compound of oxygen, hydrogen, and carbon, which constitutes woody fibre—the oxygen of the carbonic acid escaping. This escape of oxygen may be seen by placing leaves under water in the sunshine. Innumerable little bubbles of oxygen form on the surface of the leaves, and give them a silvery appearance. If continued, air-bubbles rise in the water, and if a glass tumbler full of water is inverted over them, pure oxygen in small quantities may be procured. A plant growing in carbonic acid gas, takes the carbon, and leaves the oxygen; in this way changing the acid to oxygen. Growing plants thus perform a most important office by purifying the atmosphere. Fires in burning, and animals

in breathing, consume carbon, combine it with oxygen, and then throw off the carbonic acid thus formed. This acid, being poisonous, would after a while become so abundant as to prove injurious to animal life, were it not for the wise provision by which plants consume it and restore the oxygen. Connected with this, there is another interesting proof of creative design. If there were no carbonic acid in the air, plants could not grow; but one twenty-five hundredth part, as now exists, supplies food for vegetation, and does not affect the health of animals and man.

Leaves require sunlight to enable them thus to decompose carbonic acid. It does not go on in a dark room, or in the night. An excess of oxygen in a plant makes it pale in color, and either sour or insipid in taste; an excess of carbon makes it dark green, and bitter. Hence, a potato, growing in a dark cellar is pale or white; hence the process of blanching celery and sea-kale to remove the bitter taste. Hence also the reason that a potato, too much exposed to the sun, imbibes too much carbon, and becomes bitter. Hence too, why strawberries and other fruits are more acid when hid by leaves or in cloudy weather; and why apples on the thickly shaded part of an unpruned tree are more sour and imperfect, than where, by good pruning, the leaves which feed them are fully exposed to the light, and receive a proper share of carbon.

Sap, on entering the roots, always contains some mineral substances in solution, as potash, lime, silex, &c., which is carried up into the leaves; and when a part of the moisture is evaporated, a large portion of the mineral substances is left there. This is the reason that leaves contain more than the other parts; in most of our forest trees, for instance, the leaves contain about ten times as much mineral substances as the wood. When vegetable substances are burned, these mineral parts remain behind and form *ashes.* It will be seen from what has just been said, that ashes from leaves, or leaves without burning, afford the most ashes or mineral ingredients, and thus trees return, by the annual fall of the leaf, much of these substances which have been taken from the soil.

The sap, thickened and prepared in the leaves, then descends through the inner bark, forming a layer of fresh, half liquid substance, between bark and wood, called the *cambium*—most of which, by hardening, constitutes a new layer of wood—a small part making a new layer of bark. The annual deposites of new wood, form distinct concentric rings, by which the age of the tree may be counted when the trunk is cut through. That this is the mode by which wood in exogenous trees is deposited, may be proved by an interesting experiment, performed by slitting the bark of a young tree, lifting it up carefully, and then slipping in between wood and bark a sheet of tin foil, and binding the bark on again. The bark will deposite layers of wood *outside* the tin foil, and none inside; and after a lapse of years the concentric rings will be found to correspond exactly with the time since the operation was performed.

The descent of the forming wood in the inner bark may be shown by tying a ligature around a growing branch, or by removing a ring of bark. The downward currents are obstructed, like that of a stream by a dam, and the new wood accumulates above the obstruction and not below, as shown in fig. 50.

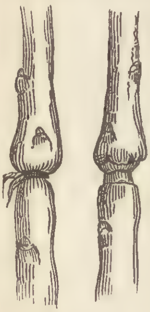


Fig. 50.

In Grafting, it is essential that some portions of the cut surfaces uniting the stock and shoot, should be placed so accurately together that the sap may flow up through the alburnum or sap wood from the stock to the shoot, and back again through the inner bark of the shoot to that of the stock. When this union takes place, the rest of the cut faces, even if some distance apart, are soon cemented by the newly forming wood, which fills all the vacant space.

In Budding, the newly set bud is cemented to the wood of the stock by the cambium, which hardens and fastens it only. The next spring the bud grows, forms a shoot, and the two portions become securely united by the new wood. Unless there is enough of the cambium to cement the wood to the stock, the operation cannot succeed; and this is the reason why, with vigorously growing stocks, which are depositing much, budding succeeds much better than with feeble growers, where but little of this cement exists.

The rapidity with which leaves exhale moisture, is shown by severing them from the stem in dry weather. They soon wither and become dry. Cut a shoot from a tree, and throw it down in the sun's rays, and it will soon shrivel, in consequence of the rapid escape of its moisture through the leaves. But first cut off all the leaves, and the shoot will remain plump a long time. This is the reason that it becomes necessary to remove the leaves at once from scions cut for budding.

Hence also the reason that plants and trees are so liable to die, if transplanted with the leaves on; a disaster which may be partially prevented in trees by removing the leaves; and in plants or cuttings with leaves on, by covering them immediately with a bell-glass, which by holding the watery vapor, keeps a humid atmosphere about them. It is for this reason, also, that when young trees lose a large portion of their roots, a part of the top must be cut off, to prevent the heavy evaporation which all the leaves would occasion.

A sunflower plant, about three feet high, was found to exhale from its leaves in very dry weather between one and two pints of water in a day. A bunch of growing grass, placed beneath a cool inverted glass, soon covered the sides of the glass with condensed drops from the vapor, and in a few minutes the water ran down the sides. These experiments show the great amount of water needed by growing plants; and also prove the great mistake which some persons commit, by leaving weeds to grow to shade the ground and keep it moist, while these weeds are actually pumping the water rapidly up from the soil, and dissipating it through their leaves.

In the spring, before the leaves expand, but little evaporation takes place from the bark, which is the reason that newly transplanted trees are water-soaked and injured at the roots, by watering them faster than they can carry off the moisture. Washing the stems should be the only watering at this period. But when the leaves are expanded, a more copious application becomes useful; but it should never be performed. as so frequently done, by flooding the tree at one time and allowing it to dry at another; or by pouring the water on the surface, which it hardens, and never reaches the roots. Keeping the soil finely pulverized, and if necessary, with an additional shading of hay or straw thickly spread over the surface, will preserve a sufficient and uniform degree of moisture; or if watering is given, the earth should be first removed from the roots, the water poured on, the earth replaced, and a mulching applied.

The absolute necessity of leaves to the growth of the tree, is shown by the fact that when leaves are stripped off by caterpillars, the tree ceases to grow till new ones expand; and if often repeated the tree perishes. Canada thistles and other noxious weeds are easily destroyed by keeping the leaves buried for one season by frequent plowings, or destroyed by constantly cutting off at the surface on their appearance. When the leaves of young pear stocks cease to act, in consequence of leaf blight, the tree no longer grows; cambium ceases to form, and they cannot be budded. An interesting illustration of the office of leaves occurred to the writer a few years since:—A yellow gage plum tree set a heavy crop; but when the fruit was nearly grown, all the leaves dropped. The fruit remained green, flavorless, and stationary, until a new crop of leaves came out. It then finished growing, acquired a golden color, and a rich and excellent flavor.

Perfect fruit requires perfect leaves; and thick, crowded, half grown leaves, give small fruit with poor flavor. The great object of pruning, and of summer pruning especially, is to give plenty of good, healthy, and not crowded foliage, and the crop will also be good.

The *green bark* of trees and plants performs the same office as leaves; and in connection with the cells adjoining, appear to fulfill sometimes an office which the leaves fail to accomplish. This is, *preserving the identity of the species or variety.* For example, bud a *pear* tree on a *quince.* All the wood above the place of union will be pear wood; all below will be quince. All the supplies which come from the pear leaves, change to quince wood the moment they pass this point; and if the budding is performed when the quince stock is smaller than a quill, yet all the wood below, when it becomes a large tree, will still be perfect quince wood, as is shown when any chance shoots or suckers spring up from below. Or, bud for example the Northern Spy, which has dark bark, with the Bellflower, which has yellow; and again, bud the Snow apple, which has dark colored bark, on the Bellflower, and the light colored Sweet Bough on this—each being an inch above the last budding. Successive dark and light bark, the peculiarity of each variety, will

remain as long as the tree grows; showing conclusively that the bark performs the finishing process in the manufacture of the new wood.

FLOWERS.

The object of the flower is the production of seed, and through them the reproduction of new plants. The protecting organs of each are, the calyx, outside, which is usually, not always, green; and the *corolla*, or flower leaves, of various colors, which are next within the calyx. These two are sometimes called the *floral envelopes;* the *essential* parts of the flowers are the *stamens* and *pistils.* Fig. 51 represents an enlarged flower of the cherry, cut through the middle, showing the small calyx, the large corolla, the many stamens, and the single pistil.

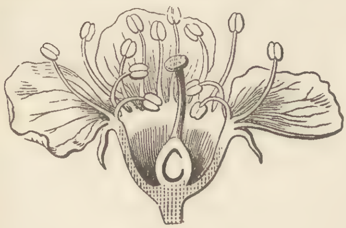


Fig. 51.

Fig. 52 is a magnified flower of the purslane, showing several pistils. The head of the stamen, (*b*, fig. 53,) is called the anther. It contains a powder called *pollen*, which it discharges by bursting open, the pollen being the fertilizing matter, essential to the production and growth of the new seed. The threadlike stalk of the stamen (*a.*) is called the *filament.*

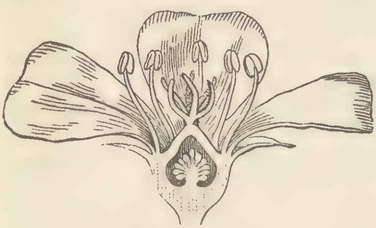


Fig. 52.

Fig. 53.

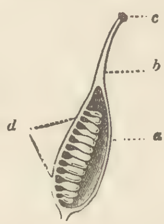


Fig. 54.

The pistil (fig. 54) consists of the *stigma*, *c*, at the top; the *style*, *b*, its support; and the *ovary*, *a*, or future seed-vessel. The *ovules*, *d*, are the rudimentary seed. The pollen of the stamens falls on the stigma, and the ovules are fertilized or impregnated, and become seeds.

Sometimes the stamens and pistils are in different flowers, on different parts of the plant. A familiar instance occurs in Indian corn, the "silk" being the pistils, and unless these are impregnated by the pollen of the anthers at the top, no grains of corn will be produced.

Sometimes the staminate and pistillate flowers are not only separate, but are on distinct plants, as the Buckthorn, Buffalo berry, and Hemp. The

pistillate flowers are said to be *fertile*, and the staminate *sterile*, and both must be planted near each other in order to obtain fruit or seed.

Sometimes the stamens, when not absent, are so defective, that they cannot fertilize the pistils, or but imperfectly. This is the case with what are termed pistillate strawberries, such, for example, as Hovey's Seedling and Burr's New Pine. In order to produce good crops, some other variety that has perfect flowers or perfectly developed stamens, as the Scarlet, or Wilson, must be planted near, from which the wind may waft or the bees carry the pollen to the imperfect flowers. Fig. 55 represents the flower of a staminate strawberry, or one where stamens as well as pistils are perfect; fig. 56 is a pistillate flower, the stamens being small, and containing but little pollen in the anthers. Fig. 57 is an enlarged view of the former, *a* being the stamens, and *b* the pistils. Fig. 58 is a flower of Hovey's Seedling, showing at *a* the dwarfed and useless stamens. Sometimes very favorable circumstances will enable these dwarfs to afford a portion of pollen, and some berries will be produced, even if they are remote from other fertilizing varieties.

Fig. 55.

Fig. 56.

Fig. 57.

Fig. 58.

Raising new varieties of fruit by crossing, is accomplished by fertilizing the pistils of one sort by the pollen from another. It was originally performed by cutting out the anthers of flowers with scissors, to prevent the influence of these stamens, and then bringing the pollen of the other sort, and applying it artificially. Fig. 59 is a pear flower, as usually seen; *a*, the pistils, and *b*, the stamens; and fig. 60 is the same with the stamens clipt out. This being a very tedious process, is now discarded, and the two sorts are planted close together, so that the branches shall intermingle, and produce cross-fertilization without any further labor. It was in this way that Dr. Kirtland produced the seed of all his new and excellent varieties of the cherry.

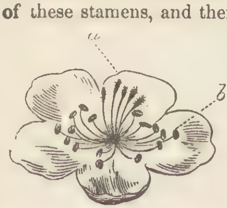


Fig. 59.

Fig. 60.

Some plants, as the squash, become cross-fertilized so easily, by the presence of bees, which carry pollen from one flower to another, that caution is required, and remote planting of the different sorts, to prevent those varieties from mixing which it is desirable to keep separate and distinct.

SPECIES AND VARIETIES.

Plants and animals, of one species, are supposed never to produce a progeny of a different, no matter how many successive generations may intervene. For example, a wolf never brings forth dogs, a cow never produces sheep, and never has, so far as we know, since the creation. Each produces "after its kind." These are therefore *distinct species.* But of some there are many breeds; of sheep, for example, there are the Merino, the Cotswold, the Southdowns, &c., which are *varieties* of the same species, the changes being gradually and slowly produced by successive generations. So also there are many varieties of dogs and of cattle.

In the same way the seed of a pear never produces an apple, these being distinct species, but it produces many different sorts of pears, which are only varieties. So the apple produces innumerable varieties, but it can never yield a pear, a quince, or a peach. Sometimes, when varieties have remained a long time distinct, without much variation by successive planting, they are termed races. For instance, the White flint, Mediterranean, and other varieties of *wheat*, and the King Philip, Dutton, Gourd seed, and other sorts of corn, may be mentioned. The races of men are analogous, "all nations having been created from one blood."*

A knowledge of the distinction between species and varieties, now so well pointed out by botanists, would prevent many of the errors which some have adopted, that plants of one species would change to another, as for instance, a useful crop to a weed with which it is liable to be much infested, and the seeds of which are easily scattered in various ways. Some erroneously suppose that wheat changes to chess, and others believe that barley changes to oats, and rye to darnel, although these are all quite distinct species.

This knowledge of the character of species, and their affinities, would frequently prevent the blunders which grafters make, in trying to make the peach grow on the willow or butternut; or the rose on the sumach. Budding and grafting succeed best when performed on plants of the same species, as apples on apples, peaches on peaches, and pears on pears. But sometimes the operation succeeds with different species of the same genus, as the pear on the apple, and the cultivated cherry will grow well on some wild species. Some varieties of the pear grow well on the large sorts of the quince. De Candole succeeded, in rare instances, in making the Bignonia grow on the Catalpa, the Olive on the Ash, and the Lilac on the Philly-

* Some persons have formerly endeavored to show that the human race might have had more than one origin; but of late years the proofs that it sprung from one source have accumulated to such an extent and magnitude as to be no longer denied by persons well informed on the subject.

rea, plants of different genera but of the same natural order, but they soon died. As a general rule, it may be said that different species work imperfectly, and often fail to adhere at all; that different genera, of the same natural order, in rare instances, may be grafted or budded, and live for a time; but no instances are known where trees of different natural orders can be made to unite.

THE GRASSES.

THE annual value of the grass crop in the United States, exceeds three hundred million dollars. An improvement, therefore, effected by procuring the best sorts for sowing, or by a better system of management, that shall increase the average crop but *one-tenth*, will add to the aggregate product no less than thirty millions. There is no question, however, that a much greater increase than this might be readily effected; for while the average product of hay per acre is not more than a ton or a ton and a half, the best farmers cut from two to three tons. There is nothing, therefore, but a want of intelligence and skill, to prevent an increase of value amounting yearly to at least three hundred million more. The subject is well worthy of more consideration than it commonly receives.

There are two ways of increasing the crop. The first is, to procure the best kinds of grasses; the second, to improve the cultivation or management. A notice of some of the most valuable species, with their qualities and characteristics, may assist in promoting the desired improvement.

The number of grasses which are highly esteemed in this country, for meadows and pastures, is very few. With many farmers, timothy, red-top, and June or Kentucky blue grass, constitute the entire catalogue. There are many hundred known speeies, some of which, if they could be subjected to proper cultivation, would doubtless prove valuable; and the enterprising cultivator who, by undertaking the task, should introduce, out of the great multitude, but one equal in value to timothy or Kentucky blue grass, would richly deserve the thanks of the whole country. The object of this brief article is to point out those of most merit which have been already tried. Its limits prevent a scientific description of the minute parts of the flower, by which alone the numerous species are accurately distinguished from each other. The cuts which are given are correct representations of the most valuable kinds, and, carefully observed, with a little additional description, will enable the reader to recognize them at once.*

There are a few general terms that every one should understand. For example, the head of wheat, barley, rye, or timothy grass, growing in an

* For the cuts of Grasses illustrating this article, we are indebted to the courtesy of CHAS. L. FLINT, Secretary of the Massachusetts State Board of Agriculture, for whose excellent Treatise on "Milch Cows and Dairy Farming," they were originally prepared.

Fig. 1—Timothy.

oblong, compact form, is termed a *spike;* and the loose and spreading head of oats, and June grass, is called a *panicle.* The *spikelets* are the small spikes on the panicles, often consisting of several seeds and chaff, as in the chess plant, where the spikelets are about an inch long, and often hold a dozen seed; or in the June grass, where they are only about the tenth of an inch long, and contain five or six seeds. A spike, as in timothy grass, is also composed of spikelets, but they are less distinct or more crowded together.

DESCRIPTION OF THE MORE COMMON SPECIES.

Timothy, or *Herd's grass* of New England, and *Cat-tail* of Britain—*Phleum pratense*, fig. 1. (The Herd's grass of Pennsylvania and the Southern States is the Red-top, wholly different from this.) The cut affords an accurate representation of this grass when in flower. The root is perennial, and often slightly bulbous. This is probably the most valuable of all cultivated grasses, and especially so for hay. It is rather coarse and harsh if left uncut too long, but mown when in blossom, or immediately after, it constitutes excellent fodder. Another advantage of cutting rather early is the after-growth, which is tardy and scant if the seeds ripen. The chief objection to this grass is the want of a good second crop; but when sown with clover, the latter supplies the deficiency, and when, in a year or two, the clover disappears, June grass often comes in and is a valuable successor, where pasturage is the object. It succeeds best on rich and rather moist soils. It is an admirable crop for reclaimed marsh or swamp. At least one peck of seed is sown by good farmers, per acre, and a larger quantity will give a heavier crop, and softer and finer hay. It may be sown as a crop by itself, either in autumn or early in spring, and brushed or very lightly harrowed in. If early in autumn, it will give a good crop the next year; and a moderate or fair one the same season, if sown in spring.

Three tons of hay to the acre, when plenty of seed has been used on fertile land, are not rare. It gives a large product of seed when allowed to ripen, varying from ten to twenty bushels per acre.

This grass has been called Herd's grass, from Herd, of New England, its supposed discoverer; and Timothy, from Timothy Hanson, of Pennsylvania, who largely cultivated and introduced it to notice. Who will introduce another grass of equal value, from the hundreds of wild species?

Meadow Fox-tail Grass—Alopecurus pratensis, fig. 2. The flowers grow in a spike, somewhat like timothy, but the spikes are shorter, and feel soft to the touch, while that of timothy is rough. The spikes appear earlier, but it grows too thin and light for hay; it makes, however, a fine early pasture. It would probably be a good mixture with other grasses in seeding down to permanent pasture. Flint says that on account of its light and bearded chaff, there are but five pounds in a bushel, and 76,000 seed to an ounce. This would be six million to a bushel, which would seed about an acre.

The *Floating Fox-tail—Alopecurus geniculatus*—resembles the preceding, but is later, and grows in water. It is found in wet meadows, ditches, and marshes. It is of no value, unless possibly it be for furnishing pasture on flooded grounds, where other grasses will not grow.

Cut-grass or *False Rice—Leersia oryzoides.* Flowers in rather one-sided panicles, coming out late in summer, stems two or three feet high; the sheaths of the leaves which clasp the stems are exceedingly rough when drawn downward through the hand, owing to very small points or minute prickles pointing downwards. The general color of the heads or panicles is a yellowish green. It grows in swampy meadows, and along the margin of turbid streams. It is a weed in the North, but is cultivated to some extent at the South, and cut as hay. It will not flourish on dry or drained land, and hence thorough draining will destroy it.

Red-top, *Herd's grass* of Pennsylvania and the South—*Agrostis vulgaris*, fig. 3. The flowers are in a loose, open panicle; the spikelets are one-flowered or one-seeded; and the whole head has usually a redish purple color, very conspicuous where growing in quantity in meadows. It grows about two feet high. Roots creeping. This grass is widely known. In England it is called *Fine Bent.* It succeeds best on rather moist soils, where it is one of the most valuable grasses, although as a whole much inferior to timothy. It is well adapted (like June grass) to sow with the latter, and forms a dense sward over the surface, which otherwise is left bare after cutting timothy for hay. It is perennial, and makes good permanent pastures, in which it should be fed down so as to prevent going to seed, which renders it unpalatable. It is one of the best lawn grasses, and, sown with June grass and white clover, forms with weekly mowing, a beautiful green carpet. The seed is small, and four to six quarts usually seeds an acre.

English Bent or *White-top—Agrostis alba*—resembles Red-top in general growth, but differs in having a light green and sometimes faintly purple

Fig. 2—Meadow Fox-tail.

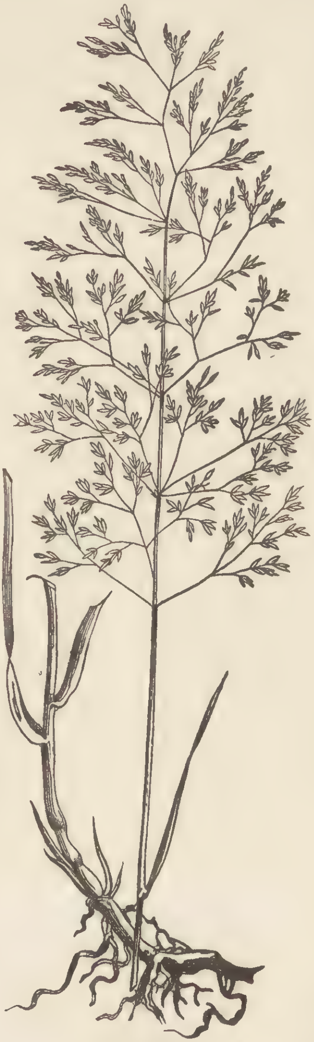


Fig. 3—Red-top

Fig. 4—ORCHARD GRASS.

panicle, and by the roughness of the sheaths of the leaves. It is of little or no value. A variety known as the *Fiorin* grass—*A. alba*, var. stolonifera)—was once in high repute, but it is now regarded as little else than a weed, difficult to eradicate, on account of its rooting recumbent stems. It grows in wet places.

There are several other species of Agrostis, but they have not been found valuable.

Nimble Will—Muhlenbergia diffusa—has a slender, branched stem, with several narrow, slender panicles; the chaff has a slender beard about a twelfth of an inch long. In Kentucky and Tennessee, it forms a pasture grass of some value, but cannot be recommended for sowing.

Blue Joint grass, or *Canadian Reed grass—Calamagrostis Canadensis*—much resembles an Agrostis in its general character; it is a large grass, sometimes growing three or four feet high. The panicles are often of a purple hue; are stiffly erect, at first contracted or narrow, somewhat resembling a spike, but afterwards more spreading. The inner chaff has a fine bristle on the back, a little below the middle. It is common on low grounds in many places, and is regarded as a valuable grass, being both nutritious and palatable. It is said to be

Fig. 5—June Grass.

abundant and much esteemed about Lake Superior. It deserves more attention from agriculturists.

Sea-Reed—Calamagrostis arenaria. The panicle is long and close, or spike-like, nearly white, leaves smooth, root (rhizoma) branching and creeping extensively in the sand. Often two or three feet high. It is not cultivated for agricultural purposes, but by holding the sand on the seacoast, where it would otherwise drift, is of great value. It has been extensively planted along the shores of Cape Cod, and has saved buildings from being buried by sand.

Orchard grass—Dactylus glomerata, fig. 4—is accurately represented in the cut, as it appears when fully grown, but when the panicle first appears, the parts are more closely crowded into nearly one cluster. It flowers earlier than timothy, or about the time of red clover, which renders it better than timothy in this respect to mix with clover. It is, however, objected to as hay, on account of its coarseness. Its great value is for pasture, and it should be kept eaten rather close for this purpose. The root is perennial, and it should be sown thickly, to prevent the irregular tussocks where thinly covering the ground. It endures drouth, and no grass is equal to this for growing in the shade, whence its use in orchards, and its name. It is thought to produce more pasture per acre than any other known grass. The seed are light and chaffy, and two bushels

Fig. 6—Rough Meadow Grass.

are required for an acre, if sown alone. It deserves more attention as a pasture grass than it generally receives.

June-grass, *Spear-grass*, or *Kentucky Blue grass*—*Poa pratensis*, fig. 5. The genus Poa comprises several valuable species, among which are the Rough-Stalked Meadow, and the Foul Meadow grass. All the species have panicles, and the spikelets usually have several flowers (or seeds) and are not often more than about one-eighth of an inch long. The leaves are generally quite smooth.

The June grass is readily distinguished by the minute cottony hair at the base of the inner chaff.

It varies much with the soil — where poor, it is small and insignificant, having little resemblance to the dense and luxuriant masses presented on rich land. Its great value is for pasturage. It attains great perfection in Kentucky. It remains green all winter under snow, and furnishes early pasturage in spring, when a good autumn growth has been allowed. It requires two or three years to form a perfect turf, and is not well adapted, therefore, to short rotations. Four quarts of seed are commonly sown on an acre. It has been confounded by some with the Blue or Wire grass of the East, (*Poa compressa,*) which is of less value, and in many places is regarded as a weed; seed of the latter have been wrongly sold in market for Kentucky Blue grass.

Fig. 7—Meadow Fescue.

Fig. 8—Rye Grass.

Fowl Meadow or *False Red-top—Poa serotina.* This grass has a large, loose panicle, and small spikelets of a redish brown or purple cast, giving it at first glance a resemblance to Red-top, (*Agrostis vulgaris*,) already described, but it is readily distinguished by having several flowers in the spikelets, (2 to 4,) while Red-top has one-flowered spikelets. It is perennial, and grows in wet meadows. Its name comes from the supposed fact of the seeds having been first scattered by ducks. It is one of the best of all grasses for wet meadows and pastures, which are occasionally overflowed, and should be mixed with other sorts for this purpose. The hay which it makes is of excellent quality, and may be cut late in the season without detriment.

Rough Meadow grass—Poa trivialis, fig. 6—much resembles June grass, but is distinguished by its slightly rough stalk, and by the panicle being rather slenderer and longer. It is not equal in value to the two preceding, but is a good grass to mix with others for seeding moist meadows, and it constitutes excellent hay.

Blue grass or *Wire grass—Poa compressa*—is readily distinguished by its flat stem. Its only value is on dry knolls and hill sides, where the soil is rather sterile, and where it forms rich and excellent but rather scant sheep pasture. The stems retain their color after the seed ripen. Its hardiness, and the tenacity of life by means of its numerous creeping roots, render it a weed in cultivated fields.

The *Annual Poa—P. annua*—is a small species, the stalk from four to eight inches high, and distinguished by the very light green hue of the whole plant. It is an annual, although the plants often survive a winter. It grows along door paths and other frequented places, is of little or no value, and is only noticed to distinguish it from other grasses of more importance.

Poa nervata is a rather coarse, light green plant, the leaves slightly rough, and the panicle large, spreading, and branches becoming drooping. The small chaff is nerved or striped. It may prove of value for very wet or marshy places, although not equal to most other sorts in quality. The seed grows in great abundance and is easily thrashed or gathered.

Meadow Fescue—Festuca pratensis, fig. 7. The Fescue grasses, (or genus Festuca,) usually grow in panicles, and the spikelets have several flowers. It differs from Poa in not having any cottony web at the foot of the inner chaff, and in the spikelets being commonly larger, and harsh to the touch, and not soft, as in the Poa. The chaff is frequently furnished with a sharp, bristly point.

The Meadow Fescue is one of the most common as well as valuable species. It is perennial, grows two or three feet high, and, mixed with other grasses, is valuable for pasture. The *Tall Fescue* resembles this, but has a larger panicle, and is of little value.

Rye Grass, or *Perennial Rye Grass*, or *Darnel—Lolium perenne*, fig. 8—grows in spikes, and the spikelets are set alternately on the wavy or zig-zag main stalk, with their *edges*, and not flat sides, towards this main stalk. It grows

Fig. 9—ITALIAN RYE GRASS.

Fig. 10—SWEET-SCENTED VERNAL GRASS.

about two feet high. It has been long known and valued in England, and has been introduced into this country, but does not prove of equal value

here. It is not cultivated, but has found its way into grass fields. Another species, called

The Italian Rye-grass—Lolium italicum, fig. 9—has been more recently introduced, and is undergoing experiment, and high hopes are entertained of its value by some.

Sweet-Scented Vernal grass—Anthoxanthum odoratum, fig. 10—is distinguished from nearly every other grass by its fine perfume while drying. The panicle is contracted nearly to a spike, but in shady places is more spreading. It is of little value in agriculture, although recommended as a mixture for early pastures, and for lawns.

The *Hungarian grass*, or *Hungarian millet—Setaria italica, var. germanica*, fig. 11—being an annual crop, and not a grass for meadows and pastures, hardly belongs here. A brief notice may, however, be useful. There are several varieties of this species, and this is regarded as one of the best. The large compound spike is well represented in the accompanying cut. It has been long cultivated in Hungary as grain for horses, and has been within a few years extensively introduced into this country, and is highly valued by many.

Another millet, wholly unlike this in appearance, which has been much cultivated in Germany and to some extent in England, as food for fowls, called the *Common Millet*, is the *Panicum miliaceum*, and has a partly drooping and much branching panicle. It has hard yellow seed.

Indian Millet is several feet high, and is a *Sorghum*, or allied to broom-corn and Chinese sugar-cane. The *Polish Millet* is a small plant with finger-like spikes, and known as a *Digitaria*.

The limits of this article will admit of only a brief mention of such grasses as become WEEDS. The two worst, the *Chess*, and *Couch grass*, were described in the last number of the REGISTER, and a brief notice given of the *Fox-tail grass*. Seve-

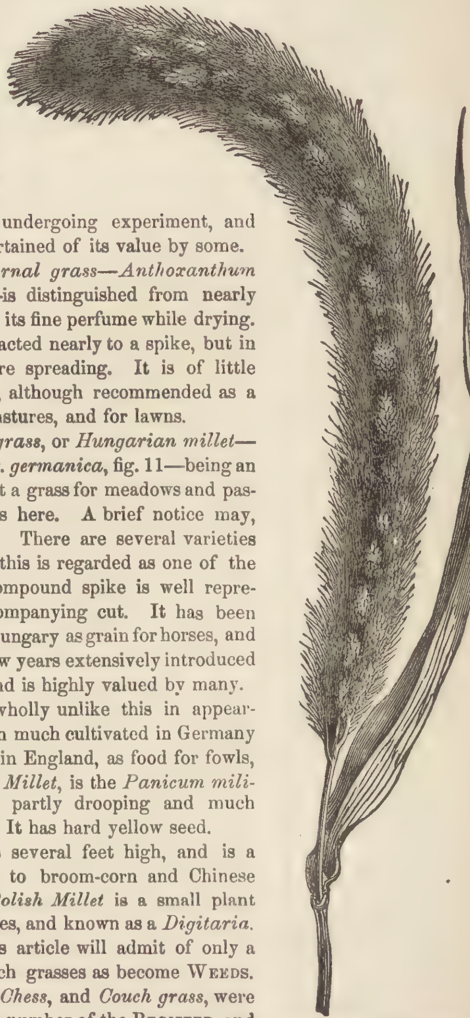


Fig. 11—HUNGARIAN GRASS.

ral species of the genus *Panicum* are weeds of more or less troublesome character, among which may be mentioned the *P. crus-galli*, and the *P. capillare*, (or the cocks-foot and old-witch grasses;) the *Digitaria* or crab grass, which is more troublesome towards the South; and the *Andropogon furcutus* and *A. scoparius*, or Indian grass, coarse brown plants, growing in poor neglected fields, and of which Dr. Darlington remarks, "no further evidence is required to demonstrate the unprofitable condition of the land, or the miserable management of the occupant."

The *Sedge grasses*, of which the genus CAREX forms the largest portion, grow mostly in wet places, and are coarse and of little value. Cattle eat them only when they can get nothing better. The sedges are eradicated by drainage and cultivation.

Of Forage plants, which are not grasses, the only ones cultivated successfully in this country, are Red and White clover. There are two or more varieties of the Red—the larger, coarser and later flowering, and the smaller, finer and earlier flowering. The latter is best for hay, the former for plowing in as green manure. The White clover is of little value in meadows, but forms a good mixture in pastures, and is especially valuable mixed with Red-top, for lawns requiring frequent mowing.

NUTRITIVE VALUE OF HAY.

According to the experiments of several eminent European agriculturists, 100 lbs. of good meadow hay are equal to about 90 lbs. of best cured clover hay, 300 to 500 lbs. of rye straw, (varying with time of cutting, &c.,) 200 to 400 lbs. of oat straw, 200 to 300 lbs. of ruta bagas, 250 to 400 lbs. of mangold wurtzels, 200 to 300 lbs. of carrots, 150 to 200 lbs. of potatoes, 30 to 60 lbs. of beans or peas, 50 to 60 lbs. of Indian corn, 65 lbs. of buckwheat, 35 to 75 lbs. of barley, 40 to 80 lbs. of oats, 30 to 70 lbs. of rye, 30 to 60 lbs. of wheat, and 40 to 100 lbs. of oil cake.

MANAGEMENT OF GRASS LAND.

The limits of this article will allow only a brief outline of the essential requisites for growing heavy crops of good grass.

The *first*, is a rich soil. Every farmer has observed the great difference in the crop on a poor knoll, and on a manured, fertile, or moist spot. Land laid down to grass should, therefore, be in the best order; and as most grass roots do not run deep, a surface manuring on heavy soils, or a coating turned in with a gang-plow on lighter land, would be very useful before seeding.

Thick seeding is the next requisite. Many thinly seeded fields show bare spots, which are so much loss in land. If these spots constitute a third of a six acre field, then two acres are wasted. It has been found by careful counting that a foot square of rich old pasture, composed of mixed grasses, contains about a thousand plants; and some highly enriched and irrigated meadows have contained nearly twice that number. This is 7 to 12 plants to

a square inch. Now, let us see how much of the different grass seeds will give this number of plants. There are in a bushel of clear seed, of

Timothy, ...	40,000,000 seeds.	Meadow Fescue,	25,000,000 seeds.
Orchard grass,.	7,000,000 seeds.	Red clover, . . .	16,000,000 seeds.
June grass,. . .	45,000,000 seeds.	White clover,. .	25,000,000 seeds.
Red-top, ...	70,000,000 seeds.		

There are about 6,000,000 square inches to an acre; and allowing for one-third not growing, there ought to be 10 seeds to a square inch, or 60,000,000 per acre. It will be seen that this would require nearly a bushel of Red-top, and more than a bushel of June grass or Timothy. There are some grasses occupying more room; for example, a good sod of Meadow Fox-tail, six years old, was found to have but 80 plants to the foot, or less than one to each square inch; there are 6,000,000 seeds of this grass to a bushel; consequently about two-thirds of a bushel would seed an acre, if all grew. Clover plants occupy as much space, and a peck to half a bushel is a good seeding.

The preceding table will show the proportions of each to take, in forming a mixture of several sorts.

The writer of this article has tried thick seeding to great advantage; from half a bushel to a bushel of mixed timothy and clover having nearly doubled the crop from ordinary quantities, and rendered it finer and softer. The coarse and harsh character of hay from new meadows would be avoided by heavy seeding.

Depth of Burying. Much seed is lost by want of moisture and no covering, and much by burying too deep with the harrow. By careful experiments it appears that most of the common species of grass grow best when covered not over one-fourth of an inch deep; at a depth of about three-fourths to one inch only one-half grows; and nearly all kinds, including red clover, fail when buried two or three inches. The character of the soil would make much difference; for example, seed might be buried nearly twice as deep on light sandy as on strong loams. Seed sown on smooth mellow ground, and rolled, will generally be covered from a quarter to half an inch, and will succeed well if not followed by drouth. On light and thin soils, a fine harrow, made of many large cut nails, driven through plank, sloping backwards, will do good service. Nothing is better to make seed "catch," and start the young grass speedily, than a top dressing of rotted manure or fine compost, just before seeding.

Old and New Seed. Grass seed two or three years old is comparatively worthless; yet there is no ready way to detect it. The temptation in dealers to mix old with new, is no doubt sometimes great. The best way to test it, is to sprinkle the seed evenly and thinly between folds of cloth, and keep these constantly wet, but not soaked, and in a warm place, for a few days. If all or nearly all sprout, the seed is evidently of the best quality; if they are plump and only half germinate, it will lead to suspicion of mixture. In this case, twice the usual quantity should be sown.

A mixture of different species, always produces more grass, especially in pastures, than only one or two sorts. The smaller fill the interstices among the larger; the roots descend to different depths, and enrich the soil more equally by the supply of dense turf.

Time and Manner of Seeding. The most common practice is to seed to grass with some grain crop. The only advantage of this is the saving of labor by sowing two crops at one plowing. The disadvantage is the shading and retarding of the grass by the overgrowth of the grain. All crops dry up the soil, by the leaves pumping up the water through the stems and scattering it to the winds. Hence, after the first germinating process, while the earth is yet wet in spring, the grain crop is detrimental. It requires more labor, but is enough better to repay it, to prepare the land late in fall, and sow grass very early in spring, with nothing else. If well seeded on a rich soil, the young plants will quickly spring up, and soon be out of the reach of drouth. It will make a good crop the first year. If not sown quite early it will be likely to fail. Or, for any hardy grasses, an equally good and perhaps better time is early in autumn, after a grain crop has been harvested from the land. If the autumn is moist, it will make a good growth before winter, and bring a heavy crop next year.

Top-dressing with manure or compost in autumn greatly improves all grass land, the soluble parts of the manure wash into the soil and enrich it—it protects the roots from cold winds and exposure—and serves as a mulch the succeeding summer. The product of grass fields has been doubled by repeated top-dressings.

Irrigation, where it can be practiced, is always advantageous. Flooding grass lands with muddy water early in spring, by passing swollen streams over freshly plowed loam, has greatly increased the crop. It effects a fine, even mulching of the plants, more perfectly than any other process can accomplish.

Feeding close in autumn, exposes the roots to cold winds, which checks their early growth in spring, while a good coating of grass serves as an excellent protection, and favors an early and abundant crop. Pastures or meadows which have been closely fed, will be greatly improved and saved by a top-dressing of litter or of compost, applied in autumn.

Time of Cutting Grass for Hay. Early in its growth, grass is watery; as it approaches blossoming, the amount of sweet nourishing juice increases; after blossoming, and as the seed ripens, the sugar diminishes, and the hard woody fibre increases. The best time, therefore, generally is to cut within a few days after the principal portion of the crop has appeared in flower. For milch cows it should be cut a little earlier than for working oxen and horses. Hard stemmed grasses, as Orchard grass and Timothy, should be cut earlier than softer sorts.

Expense of Making Hay. When meadows were cut by scythes, and raked by hand-rakes, the cost of securing the crop was computed to be one-

half its value. Now, by the use of mowing machines, horse-rakes, horse-forks, &c., it need not be one-fourth, as the following estimate for cutting fifty acres will show:

Interest on $100, cost of Mowing Machine	$7 00
Wear and tear, annually, say	3 00
Team and man, 8 days, 6 acres per day, (a low estimate,)	20 00
Cost of cutting 50 acres	$30 00
Raking, horse and man, 20 acres a day	5 00
Drawing, if 2 tons per acre, 2 men and 1 team; with horse-fork, 8 tons daily, $3 per day, 12 days	36 00
Contingencies, rain, &c, say	7 00
Cost of securing 100 tons	$78 00

Or, 78 cents per ton. It will be observed, however, that the team of the farmer stands idle much of the time in harvest, and that the actual cost, as compared with the old way, would therefore be really less. Where the hay is secured in stacks or in hay-barns situated contiguous to the meadow, the use of the hay-sweep in connection with the horse-fork, would probably enable two or three men and two boys, with three horses, to draw and pack away *thirty tons a day or more.*

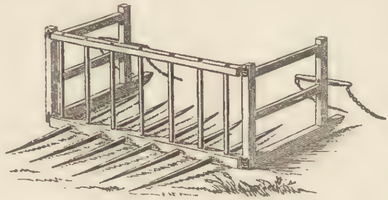


Fig. 12—Hay Sweep.

Fig. 13—Hay Sweep in Operation.

The hay-sweep is but little known.—The accompanying figures (12 and 13) exhibit its construction and use. It is essentially a large, stout, coarse rake, with teeth projecting both ways, like those of a common revolver; a horse is attached to each end, and a boy rides each horse. A horse passes along each side of the winrow, and they thus drag this rake after them, scooping up the hay as they go. When 500 pounds or so are collected, they draw it at once to the stack or barn, and the horses turning about at each end, causing the gates to make half a circle, draw the teeth backwards from the heap of hay, and go empty for another load—the

teeth on opposite sides being thus used alternately. To pitch easily, the back of each load must be left so as to be pitched first.

The dimensions should be about as follows:—Main scantling below, 4 by 5 inches, 10 feet long; the one above it, same length, 3 by 4 inches; these are three feet apart, connected by 7 upright bars, 1 by 2 inches, and 3 feet long. The teeth are flat, 1½ by 4 inches, 5 feet long, or projecting 2½ feet each way—they are made tapering to the ends, so as to run easily under the winrow. A gate, swinging half way round on very stout hinges, is attached to each end of this rake, and to these gates the horses are attached. They consist each of two pieces of scantling, 3 inches square and 3 feet long, united by two bars of wood 1 by 2 inches, and a third at the bottom 3 inches square, and tapering upwards like a sled-runner—these runners project a few inches beyond the gate. The whiffle-trees are fastened a little above the middle of the gate, and should be raised or lowered so as to be exactly adjusted. It may be made for $5.

In using this machine, not a moment is lost in loading or unloading. No person is needed in attendance, except the two small boys that ride the horses. If the horses walk three miles an hour, and travel a quarter of a mile for each load, they will draw 12 loads, or three tons an hour, or 30 tons in 10 hours, leaving the men wholly occupied in raising the hay from the ground when deposited by means of another horse with the pitchfork.

It will be obvious that this rapid mode of securing hay will enable the farmer to elude showers and storms, which might otherwise prove a great damage.

The horse-pitchfork is figured and particularly described in a former number of the Register.

HOW TO PUT UP A LIGHTNING ROD.

Having been repeatedly requested to give practical directions on this subject, we present a few brief instructions, illustrated with figures. In order that every one may know what is essential to success, we give in the first place a few rules or necessary requisites.

ESSENTIALS.

1. The rod must extend several feet at bottom into moist earth.
2. It must be connected throughout—not essentially in one piece, but if more than one, they must be in contact.
3. It must be sharp at top, and if there are several points, to divide any discharge, all the better.
4. It must be half as high above the top of the building, as the distance horizontally to the most remote part of the top.

5. It should be large enough to carry off any discharge without danger of being melted or broken.

NON-ESSENTIALS.

1. It is needless to keep the point bright, provided it is sharp. Hence, gilding or tinning, although giving a handsome finish, is little or no better than a point of iron, filed bright and sharp, which cannot hold moisture, nor become dull by rusting, in many years.

2. Insulators, made of iron staples or sockets holding rings of glass or horn, are of no value; as a slight charge from an electric machine will leap across such a small insulation; and when wet in any shower the glass conducts freely. A good, continuous rod, running into moist earth, will carry down the electricity, no matter what supports it—the fluid always takes the best conductor, if a continuous circuit is found. Wooden supports are cheapest, as good as any, and better than many others.

MATERIALS.

For general purposes, iron is best; copper is a better conductor, but the cost of this metal is as much greater than iron, as its increased value. At the same time, iron is stiffer, and will withstand the wind. As iron becomes slowly oxidised by water, it would be better to construct that part which passes into the earth of copper, which moisture alone does not rust. Iron rod, one-half or five-eighths of an inch in diameter, is large enough. Smaller rod has been melted by a discharge of lightning, but this size is safe.

CONNECTIONS.

The simplest and best way to fasten the several rods together, to make one whole, is to weld the ends. This is done by a common blacksmith, passing the rod thus made through the opposite doors of his shop. It is then dragged home by tying to a wagon. Where the building is very high, it may be difficult to ereet the rod in one piece; in which case the connections may be made by screwing the two ends into a nut, as in fig. 1; or the ends may be spliced and screwed together, as in fig. 2, but this is less strong or firm. The points are made by welding to one end half a dozen smaller rods, (say $\frac{3}{8}$ inch diameter and 6 inches long,) after having sharpened them, and then bending them outward. Fig. 3 shows these points as welded on, and fig. 4 the same spread out. If filed sharp, like needles, they will remain so as long as the rod stands, but it gives them a handsomer appearance to tin them.

LENGTH AND HEIGHT.

The rule for the height above the building is this:—A rod in the center will protect a space whose diameter is four times the height of the rod above the building. If, for example, a building is 40 feet long, a rod in the middle 10 feet above the roof, will be a sufficient protection (fig. 5); but if at one

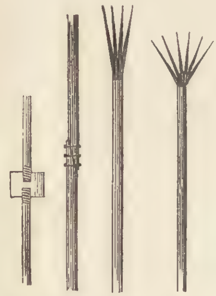


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

Fig. 5.

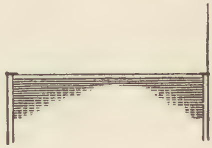


Fig. 6.

Fig. 7.

Fig. 8.

end, it must be 20 feet above (fig. 6). A barn 80 feet long, must either have a rod in the middle 20 feet high, or one at each end 20 feet high; or, if two are placed each 20 feet from the ends (fig. 7) they need be but 10 feet high, because each protects a circle of 40 feet diameter. Every rod should enter the ground to a depth of at least six feet. Add the height of the building to this depth, and to the height above it, and we shall have the required length; but if the rod is placed in the centre, the height of the building must be determined, not by measuring it perpendicularly, but along up the slope of the roof.

SUPPORTS

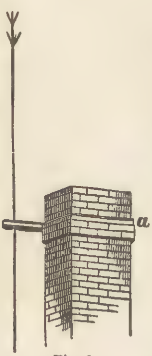


Fig. 9.

Wood is the best and cheapest. The only requisite is to hold the rod firmly. Usually a short bar, securely nailed to the building, with an auger hole at the outer end for the rod to pass through, is all-sufficient. Such a support is represented by fig. 8. The upper support on a chimney may be a light square wooden frame, *a*, fig. 9, nailed together, and accurately fitting the chimney outside, one of the rods forming the frame projecting a foot, through which a hole is bored to receive the rod. A carpenter will make such a frame in half an hour. At the foot of the chimney, a piece of plank with a hole through the upper edge, as shown by fig. 10, is nailed on the roof, so as to keep the rod about six inches from it. One or more like this may be placed between the chimney and eaves, to keep the rod above the roof. At the eaves, a very simple fastening is made, consisting merely of a piece of board, with a hole through the outer end, nailed on the roof, or still better beneath the eaves, and projecting a few inches.

Fig. 10.

In all these instances, it is obvious that the lower end of the rod must be thrust through these supports before they are nailed to the building, and

before the rod is elevated, and both must go up together. Three or four hands may be needed to do this work for a tall house.

STIFFENERS ABOVE THE ROOF.

Where there is no chimney or other projection above the roof, for a support, a short stiff wooden point should be placed where the rod is to be erected. This wooden piece may be set perpendicularly into the timbers, when the roof is made, and firmly secured in its position. But when this has not or cannot be done, a four-legged bracing may be attached to the ridge of the roof as shown in fig. 11, the legs being made of small strips of board an inch by an inch or two, and three to five feet high, according to the height of the rod above. They are nailed to the roof, and to a small block at the top, with a hole for the rod.

Fig. 11.

In order to stiffen that part of the rod above the roof, it should be largest at the roof, and taper upwards, which is easily effected by welding three or four rods of different sizes together at their ends, the lower one being about an inch in diameter, the next above three-fourths, the third five-eighths, and the upper one-half an inch.

Fig. 12.

ENTERING THE EARTH.

The most important and most frequently neglected requisite, is a sufficient depth for the rod below. If it enters but a short distance, the earth may become dry in summer, and thus being a poor conductor, the rod may do more harm than good, by inviting the fluid but not discharging it. Houses having rods, have been torn to pieces in consequence of this deficiency. *The rod should enter permanently moist earth.* This is sufficient. It is not commonly found less than five or six feet deep. To assist in the discharge and dissipation of the fluid, place a bushel (more or less) of charcoal in the bottom of the hole, into which the rod may enter. Charcoal is an excellent conductor, and will scatter the lightning into the earth. As the iron rod which enters the soil may in many years become rusted through, it is safest to use copper for this part; either a copper tube, the size of the rod, or several narrow copper straps riveted on a few inches above the ground, and spreading off in different directions below.

THE COPPER ROD.

The objection to the use of a copper rod, is its increased cost and want of stiffness. But a perfect copper conductor may be made by erecting a pole for its support. This pole may be a few feet from the building, and rising a sufficient height above it, according to the rule already given. A copper strap, nailed to this post, serves as the conductor. It would be best if in one

piece, coiled, and unrolled as nailed on. The upper end may extend a foot or so above the pole, and be sheared into sharp points, as in fig. 12. The lower end enters the earth six or seven feet, and has a bed of charcoal about it. An objection to this kind of conductor is the cost of erecting the pole, and its liability to decay and fall in a few years. This objection is removed by securing it to the building itself, and to a stiff rod of sufficient height above it, erected when the building is made.

VARIOUS ERRORS.

Very few inventors of patent rods understand fully the principles of electricity, and most of them fall into serious errors. One has been already mentioned, namely, insulating iron staples, with small glass or horn rings, which the smallest charge of a machine would pass. Another is the alledged necessity for silver, or platinum, or palladium points. Iron, if sharpened like a needle, will always remain so, as it cannot retain a drop of water nor rust. Another is, twisting together many wires, copper or iron, or both, claiming that this gives more surface, according to the well known principle that the fluid remains in the surface. The error consists in supposing that the fluid exists on inner surfaces, or sunk faces. Make a conducting body in the form shown by fig. 13, or with various depressions; insulate and electrify it. Apply the *trial planes* which electricians use, to the depressions, and they will be found to contain no electricity at all. It is only the outer parts of a conductor that hold the fluid. Hence the inner surfaces of the wire conductors are of no value.

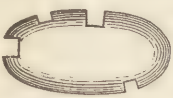


Fig. 13.

Another error is, the assertion that painting an iron rod makes it a non-conductor. Those who make the assertion never tried the experiment. Trial shows it to be perfectly groundless.

Another error is, in making angular rods, on the supposition that the angles will draw the fluid. They discharge it as readily as they drew it; and hence, if a heavy charge should come down from the clouds, they would tend to throw it into the building from the angles, if there were any impediment below. We admit, however, that when all the connections are perfect, these angles would be neither useful nor detrimental.

COST OF RODS.

We give a single bill of cost, of two rods erected on barns last year by the writer. One barn was 54 feet long—the rod was placed in the middle, and extended 15 feet above the roof—total length of rod. 55 feet. The other barn was 38 feet long, the rod also in the middle, extending 11 feet above, and total length 49 feet. Round iron rod was used, five-eighths of an inch in diameter, except the lower portion above the roof, which was partly an inch, partly three-fourths, and so tapering upwards. The rods were stiffened as shown in fig. 11. The following was the entire cost of both rods:—

Cost of 103 feet rod, ...	$3.68
Blacksmith work, welding, setting on points, &c.,	1.50
Tinning the points,	25
Digging the holes,	50
Charcoal,	20
Carpenter, erecting	87
Total cost,	$7.00

If an itinerant erector had been employed, he would have probably bristled these buildings with various points, at a cost of some twenty or thirty dollars, at doubtful value or permanency.

"BALLOON FRAMES."

By Geo. E. Woodward, Architect and Civil Engineer, No. 29 Broadway, New-York.

[WRITTEN FOR THE ANNUAL REGISTER OF RURAL AFFAIRS.]

Illustrated, from Original Drawings by the Author, made from Practical Examples.

"If it had not been for the knowledge of balloon frames, Chicago and San Francisco could never have arisen as they did, from little villages, to great cities in a single year."—Solon Robinson.

In these days of ballooning, it is gratifying to know that there is one practically useful, well tested principle, which has risen above the character of an experiment, and is destined to hold an elevated position in the opinions of the masses. That principle is the one which is technically, as well as sarcastically, termed Balloon Framing, as applied to the construction of all classes of wooden buildings.

The early history of the Balloon Frame is somewhat obscure, there being no well authenticated statements of its origin. It may, however, be traced back to the early settlement of our prairie countries, where it was impossible to obtain heavy timber and skillful mechanics, and the fact is patent to any one who has passed through the pleasures and the vicissitudes of the life of a pioneer, that his own necessities have indicated the adoption of some principle in construction, that, with the materials he has at hand, shall fulfill all the necessary conditions of comfort, strength and protection. To these circumstances we must award the early conception of this frame, which, with subsequent additions and improvements, has led to its universal adoption for buildings of every class throughout the States and cities of the west, and on the Pacific coast.

The Balloon Frame has for more than twenty years been before the building public. Its success, adaptability, and practicability, have been fully demonstrated. Its simple, effective and economical manner of construction, has very materially aided the rapid settlement of the West, and placed the art of building, to a great extent, within the control of the pioneer. That necessity, which must do without the aid of the mechanic or the knowledge of

his skill, has developed a principle in construction that has sufficient merit to warrant its use by all who wish to erect in a cheap and substantial manner any class of wooden buildings.

Like all successful improvements, which thrive on their own merits, the Balloon Frame has passed through and survived the theory, ridicule and abuse of all who have seen fit to attack it, and may be reckoned among the prominent inventions of the present generation, an invention neither fostered nor developed by any hope of great rewards, but which plainly and boldly acknowledges its origin in necessity.

The increasing value of lumber and labor, must turn the attention of men of moderate means to those successful plans which have demonstrated economy in both, and at the same time preserved the full qualities of strength and security so generally accorded to the old fogy principles of framing, and which, we presume to say, is inferior in all the true requisites of cheap and substantial building. Light sticks, uninjured by cutting mortices or tenons, a close basket-like manner of construction, short bearings, a continuous support for each piece of timber from foundation to rafter, and embracing and taking advantage of the practical fact, that the tensile and compressible strength of pine lumber is equal to one-fifth of that of wrought iron, constitute improvements introduced with this frame.

If, in erecting a building, we can so use our materials that every strain will come in the direction of the fibre of some portion of the wood work, we can make inch boards answer a better purpose than foot square beams, and this application of materials is one reason of the strength of Balloon Frames.

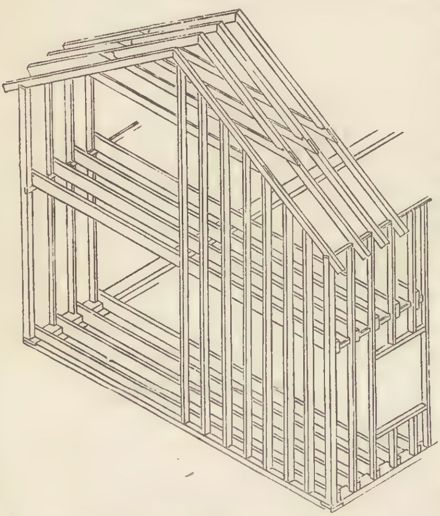


Fig. 1—Isometrical Perspective View of the Balloon Frame.

The Balloon Frame belongs to no one person; nobody claims it as an invention, and yet in the art of construction it is one of the most sensible improvements that has ever been made.

That which has hitherto called out a whole neighborhood, and required a vast expenditure of labor, time, and noise,

can, by the adoption of the balloon frame, be done with all the quietness and security of an ordinary day's work. A man and boy can now attain the same results, with ease, that twenty men could on an old fashioned frame.

The name of "Basket Frame" would convey a better impression, but the name "Balloon" has long ago outlived the derision which suggested it.

The moment the foundation is prepared, and the bill of lumber on the ground, the balloon frame is ready to raise, and a man and boy can do all of it. The sills are generally 3 inches by 8 inches, halved at the ends or corners, and nailed together with large nails. Having laid the sills upon the foundation, the next thing in order is to put up the studding. Use 4 by 4 studs for corners and door posts, or spike two 2 by 4 studs together, stand them up, set them plumb, and with stay laths secure them in position. Set up the intermediate studs, which are 2 by 4 inches, and 16 inches between centres, toe or nail them diagonally to the sill. Then put in the floor joists for first floor, each joist to be placed alongside each stud, and nailed to it and to the sill. Next measure the height to ceiling, and with a chalk line mark it

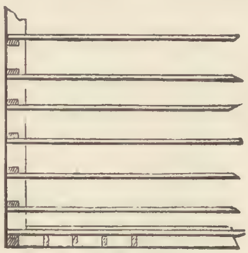


Fig. 2—Floor Plan.

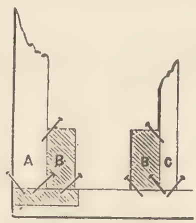


Fig. 3—Elevation Section—manner of nailing—A. corner stud, 4 by 4—B. joist, 5 by 3—C. 2 by 4.

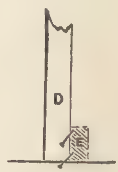


Fig. 4—Upper Edge of Joist—E. Stud.

around the entire range of studding; below the ceiling line notch each stud one inch deep and four inches wide, and into this, flush with the inside face of the studding, nail an inch strip four inches wide. This notch may be cut before putting up the studs. If the frame be lined on the inside, it will not be necessary to notch the strip into the studs, but simply to nail it to the studding; the object of notching the studding is to present a flush surface for lathing, as well as to form a shoulder or bearing necessary to sustain the second floor; both of these are accomplished by lining inside the studding—(for small barns and out-buildings that do not require plastering, nail the strip 4 by 1, to the studding)—on this rests the joists of the second floor, the ends of which come flush to the outside face of the studding, and both ends of each joist are securely nailed to each stud; the bearing of the joist on the inch strip below, it is close by the stud, and the inch strip rests on a shoulder or lower side of the notch cut to receive it. This bearing is so strong that the joists will break before it would yield. Having reached the top of the building, each stud is sawed off to an equal

height; if any are too short they are spliced by placing one on top of the other, and nailing a strip of inch board on both sides. The wall plate, 2 by 4 inches, is laid flat on top of the studding, and nailed to each stud; the rafters are then put on; they are notched, allowing the ends to project outside for cornice, &c. The bearing of each rafter comes directly over the top of each stud, and is nailed to it.

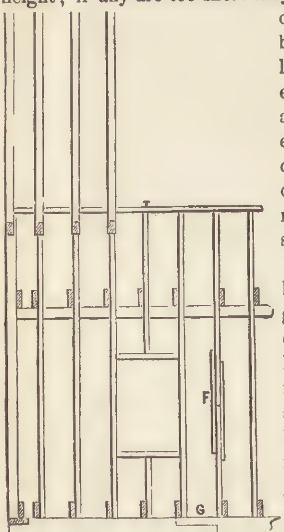


Fig. 5—SIDE ELEVATION.—G. Manner of splicing sills—F. Manner of splicing studs.

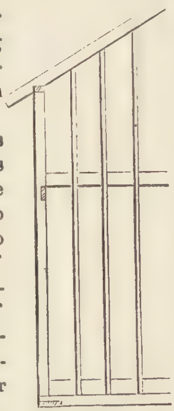


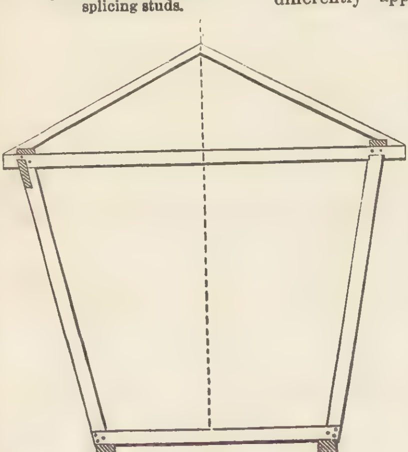
Fig. 6—END ELEVATION.

A Balloon Frame looks light, and its name was given in contempt by those old fogy mechanics who had been brought up to rob a stick of timber of all its strength and durability, by cutting it full of mortices, tenons, and auger holes, and then supposing it to be stronger than a far lighter stick, differently applied, and with all its capabilities unimpaired.

Properly constructed, and with timber adapted to its purposes, it will stand securely against the fury of the elements, and answer every purpose that an old fashioned timber frame is calculated to fulfil.

If the building is to be erected on piers, as is often done with barns and outbuildings, then the sills should be heavy, as shown in fig. 5.

Fig. 7 shows a half section of two modes of framing corn cribs. The lumber or timber may range in size from 2 by 4 up, according to the capacity requir-


No. 1. Fig. 7. No. 2.

ed—2 by 4 inch stuff, except for floor timbers and sills, is sufficiently large for the ordinary size of these buildings.

Where the building is supported on posts, heavy sills are necessary, and the frame should be securely nailed or spiked together. The bents may be 16, 24 or 30 inches apart, and covered in the usual manner. The thrust of both the rafters and contents of the building are outward; the tie, 1 by 4, is abundantly strong, as each one will practically sustain in the direction of its fibre, three tons.—The floor joists are nailed to studs at each end. No one need fear any lack of perfect security, as these ties exceed in strength any hold that tenons could have.

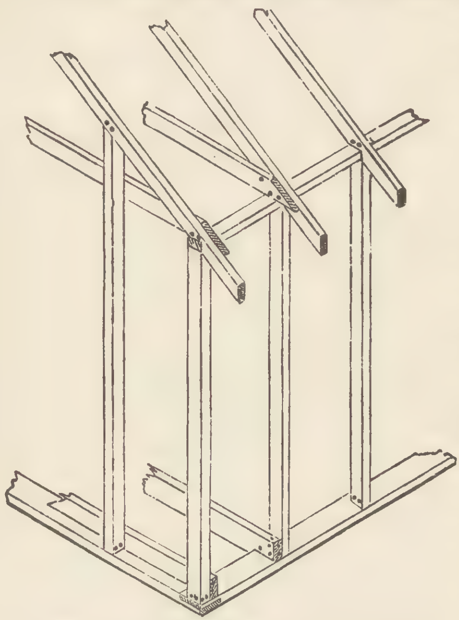


Fig. 8—Isometrical Perspective Balloon Frame.

Fig. 8 illustrates the manner of framing buildings of one story, such as are used about most every farm or country seat, as tool houses, granaries, wash houses, spring houses, &c., &c., and on southern plantations admirably adapted for the erection of negro cabins in a cheap and attractive style, adding much to their appearance and economizing in their cost.

Very small buildings, if unplastered, will not require ceiling joists; a tie at each end will be all-sufficient. Moderate size buildings will be strong enongh if the ceiling joists are left out, and collars put on half way up the rise of the rafter. According to the size and uses of the building, the collars or ceiling joists may be put on every rafter, every other, or every third rafter; floor joists should be about 16 inches between centres, and the studding may be from 16 inches to 8 feet apart; in the last case only, every sixth floor joist is nailed to the stud, the intermediate ones being arranged equally distant from each other between the studding. Where the studding is placed wide apart, the plate must necessarily be heavier to sustain the roof; if vertical

siding be used it should be nailed to the sill and plate, and to an intermediate horizontal strip spiked in between the studding; if done in this way the plate may be lighter; when horizontal siding is used, the studding should not be more than 4 feet apart—in small buildings. say 12 by 20 feet, we should cut all our stuff, except joists, from 1¼ inch plank. Studs four inches wide, rafters 5 inches wide; floor joist should be 2 by 9 inches, and put all up 30 inches between centres.

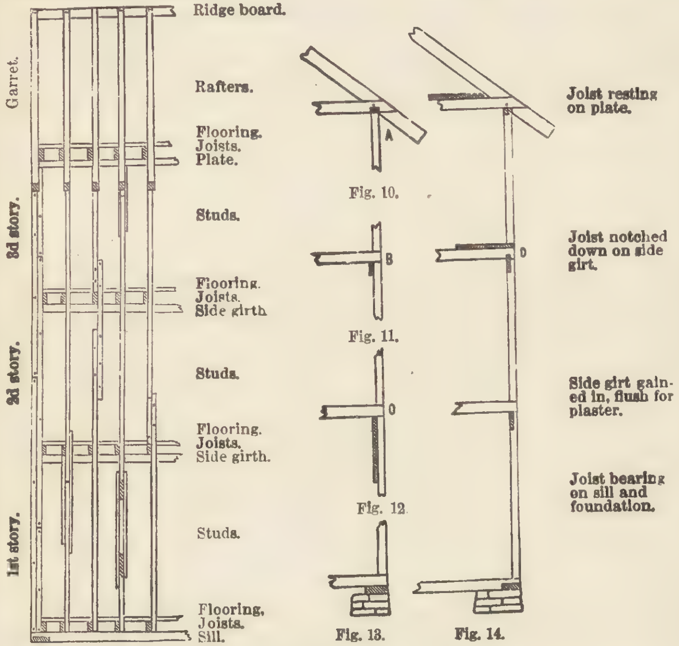


Fig. 9—Three Story Building. Balloon Framing. Details.

Fig. 10. Joist notched down on plate. Fig. 11. Side girt not gained in for small unplastered buildings. Fig. 12. Inside lining—answers the same purpose as a side girth. Fig. 13. Joist bearing on sill.

In fig. 9 is shown the manner of constructing frames for buildings of three stories. The corner stud, 4 by 4, is composed of and built up with two 2 by 4 studs, which are nailed together, breaking joints as the building progresses in height; the splicing of studs is done in the same manner, being nailed together as fast as additional length is required; the joists of the last floor are laid upon the plate, and they act as tie-beams to sustain the thrust of the rafters. We consider the splice where the studs butt and have side strips nailed to

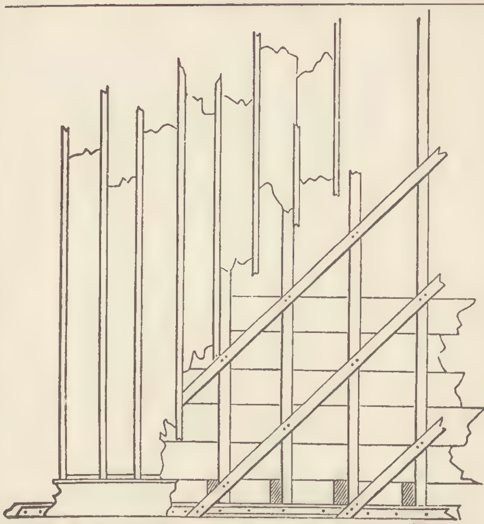


Fig. 15—Diagonal Ribs for Vertical or Battened Siding.

them, to be the most secure; the lapping splice is very generally used, however, and found to answer every purpose.

Ribs for vertical siding may be put on in two ways; one as shown, by which the ribs run over the sill and are nailed to it; a strip of the same thickness as ribs, say $1\frac{1}{4}$ inches, nailed on to the sill to fill up the space between the ribs, and is then covered by the outside plinth or base. The other plan is to set the studs back $1\frac{1}{4}$ inches from face edge of sill; then let the end of ribs bevel down on the sill, or dovetail them into the edge.

Either outside or inside lining may be used, or both together. Where diagonal lining is used it should be reversed or run the other way on the opposite side of the house.

Where a frame is lined inside it is best to do it as shown in fig. 17, as it becomes an additional tie to the corners of the frame, it being alternately lapped on the corner stud.

The lining of a Balloon Frame adds immensely to its strength, particularly

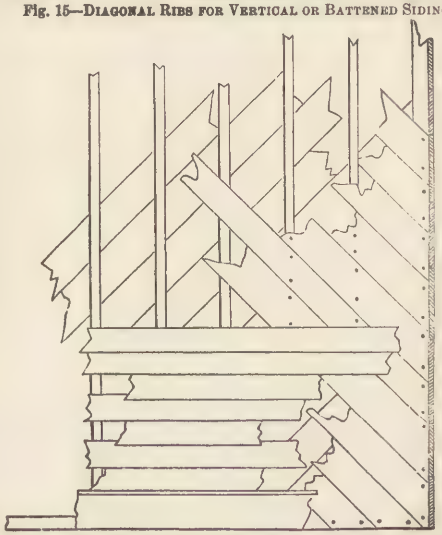


Fig. 16—Showing the manner of Putting on Diagonal Lining Outside and Inside. Siding may be Horizontal or Vertical.

so if put on diagonally; it may be done outside or inside, though on the whole the inside is preferable. If done outside, it should be carried over the sill and nailed to it; the sill being wider than the studding, in order to get a larger bearing on the masonry, and the floor joists being in the way, does not admit of inside lining being put on in the same manner.

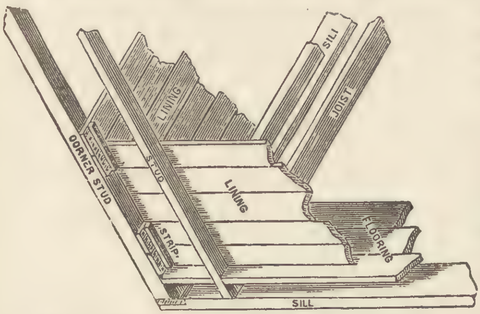


Fig. 17—Manner of Lining Balloon Frames inside.

A first class Balloon Frame should be lined, if for vertical siding, outside the studding—if horizontal siding is used, line inside; it makes the frame stiffer and the building warmer.—Some line diagonally, say from centre next the first floor towards extreme upper corners both ways; others line one side diagonally in one direction, and the other in an opposite direction. This makes assurance of strength doubly sure. If lined inside, nail perpendicular lath to the lining 16 inches from centres, and on this lath horizontally for plastering.

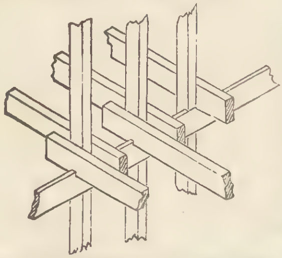


Fig. 18—Manner of Framing Partitions that run two or more stories.

In the construction of Balloon Frame houses, the studs for those partitions that run through the building are not cut separately for each floor, as in the old mode of framing, but are preserved entire, or spliced when required, in the same manner as the outside frame. The studs pass between the joists of each floor, which rest upon a girt 1 by 4 inches, let into the studs. The joists are locked over this girt, by cutting an inch notch on the under side, and lap each other from 8 inches to 1 foot, as shown in fig. 18.

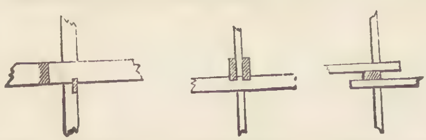


Fig. 19—Side View. Fig. 20—End View. Fig. 21—Plan.
Showing Manner of Framing Partitions.

The flooring, when laid, is nailed to all the joists, and each joist should be brought close up alongside the stud.

Figs. 19, 20 and 21 are the side view, end view, and plan of joists, showing the manner of doing the work. The side girts on the partition studding

should be put on an inch higher than the side girts on the outside frame, unless both ends of the floor joists are notched, to be locked over the girts.

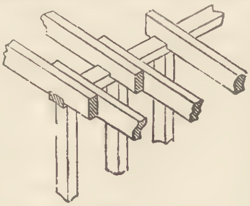


Fig. 22.
Showing manner of framing partitions that run only one story.

Fig. 22 shows the manner of arranging joists over a partition that does not run above one story, or that which has no partition over it on the next floor. This is like the old mode, except that the joists are notched and locked over the plate. The object of lapping and locking joists, is to make them a continuous tie from one side of the building to the other, and when the flooring is nailed on, they are practically as strong as if they were in one solid piece. This prevents bulging, and the joists of all frames, whether Balloon or otherwise, should be arranged in this manner.

It will be observed, on looking again at fig. 18, that there are three continuous ties, in three different directions—thus, up and down, lengthwise and crosswise, and that *every joint* in the frame, whether outside or inside, has each of these three different conditions of strength. This applies to the naked frame. After the flooring is laid, and the outside boarding on, the building becomes so knit together, laced and interlaced, that it is as one entire piece.

The principle of Balloon Framing is the true one for strength, as well as for economy. If a mechanic is employed, the Balloon frame can be put up for *forty per cent. less money* than the tenon and mortice frame. If you erect a balloon frame yourself, which you can easily do without the aid of a mechanic, it costs the price of the materials and whatever value you put upon your own time.

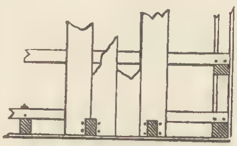


Fig. 23.
Showing lengthwise and crosswise manner of tying frame.

Fig. 23 shows the manner of attaching the flooring to gable end studding and in those buildings in which the thrust of the rafters is in the direction of the flooring—if every third stud be bolted to the joist in the manner shown, it makes the tie equal if not superior to that in the direction of the joists.

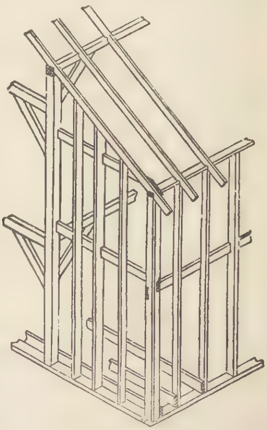


Fig. 24.
Manner of Framing Large Barns.

Fig. 24 explains the manner of framing the largest class of barns. Wide openings, like bays, require the use of heavy timber, and the

mortice, tenon and brace, only so far as the gallows frame is concerned; the balance of the frame is of light stuff, studding 2 feet to 2½ feet apart, 2 by 6 inches, every third one 2 by 8 inches, into which is gained the side girt, it being nailed to the others. On this rests one end of the temporary floors, the gallows frame supports the roof, and the rafters are secured to it, so that they become ties. The side of this building is like a floor turned on edge, and is firmly secured by the floor joists at the bottom and the rafters at the top.

Warehouses, depots, and other buildings of a very large size, can be made stronger by using the Balloon Frame, instead of the heavy timber frame. Those who prefer to err on the right side, can get unnecessary strength by using deeper studding, placing them closer together, putting in one or more rows of bridging, and as many diagonal ribs as they like. In large buildings there is no saving in timber, only the substitution of small sizes for large—the great saving is in the labor, which is quite important.

The following are some of the advantages claimed for the Balloon Frame:

1. The whole labor of framing is dispensed with.
2. It is a far cheaper frame to raise.
3. It is stronger and more durable than any other frame.
4. Any stick can be removed, and another put in its place, without disturbing the strength of those remaining—in fact, the whole building can be renewed, stick by stick.
5. It is adapted to every style of building, and better adapted for all irregular forms.
6. It is forty per cent. cheaper than any other known style of frame.
7. It embraces strength, security, comfort, and economy, and can be put up without the aid of a mechanic.

MOVABLE COMB BEE HIVES.

[Written for the Illustrated Annual Register, by M. Quinby.]

If a clock had stopped, and was so constructed that we could not get at the interior to see the difficulty, without spoiling it, we would be in about the same predicament that we are with a colony of bees in the old box hive, not in running order, and which wants repairs in some little wheel, axle or cord. The clock runs, if properly made and set up, until something interferes with its operation, or some weak part gives out. So with bees, an ordinary swarm put into a hive works regularly until some part of our artificial arrangements are out of order and wanting repairs. Now we have a hive, like the clock, that can be taken in pieces, every part examined, the evil found and remedied, and the parts united together and again put in motion. After hundreds

of worthless patents inflicted on bee-keepers, we have at last an improvement. There is no longer need of *guessing* about the interior. It is unnecessary to wait a post mortem examination, or to depend on a diagnosis from outside appearances. If your hive is queenless, the fact can be at once known and remedied, without waiting till it is ruinously reduced to ascertain. Should the queen produce nothing but drones, the discovery is early made. She can be readily looked up and removed, and her place supplied with a more profitable incumbent. If the bees have made, as they often do, an unprofitable amount of drone comb, it may be removed and its place supplied with worker comb instead. When the moth worm has effected a lodgment in the combs, they are readily taken out, and he is successfully attacked in his strongholds.

If the apiarian wishes to limit the number of his swarms to one from each hive, he can, a few days after the first has issued, take out the combs, remove all the queen cells but one, and prevent all after swarming. When one hive has a surplus of stores and another is deficient, it only requires an exchange of a comb or two, which is readily made, to equalize and benefit both. When combs get old and need renewing, the cells being reduced in size, it is only necessary to substitute empty frames in place of the full ones to effect it.

For making artificial swarms, and rearing queens artificially, I know of no other hive with facilities equal to this. And now, the introduction of the Italian bee into this country, makes some form of the movable combs almost indispensable to all who intend propagating this variety. Very likely, after having purchased and introduced a queen into a colony of native bees, curiosity would induce an examination the next day, to see that all is safe. A very few moments would suffice to obtain the assurance, with this hive, while with the box it would be necessary to wait several days for brood to appear, or drive out the bees—a slow, tedious process—and look her up.

The movable comb hive proper was not obtained with the first effort, but is the result of successive steps or degrees. The first attempt was long since made by different apiarians of Europe, and a few in this country. The first form was simply a series of cross-bars at the top, the ends resting on rabbeting, to support the combs instead of being attached to the board top. (Fig. 1.) Guide combs were attached to these bars, in order to have the bees work them straight. Access to the interior of the hive was had by taking off one of its sides. The combs were removed in succession by detaching with a knife the edges where they were joined to the hive. (The bees, during these operations, are quieted with smoke blown

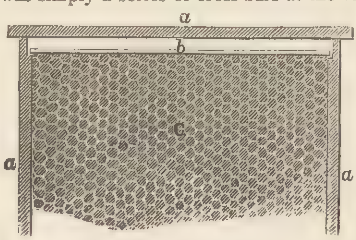


Fig. 1.
a. a. a. Hive. b. Bar. c. Comb, attached to hive.

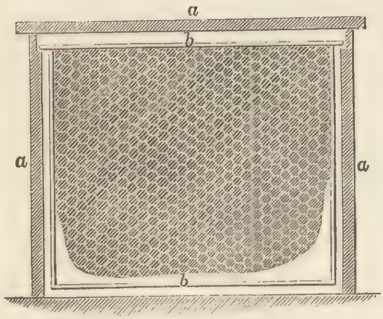
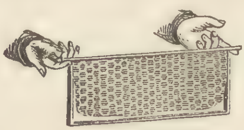


Fig. 2—a. a. a. Hive—b. b. Frame.



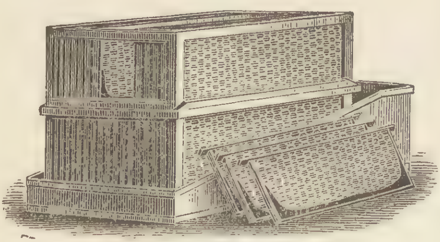


Fig. 3—Movable Frames Taken Out.

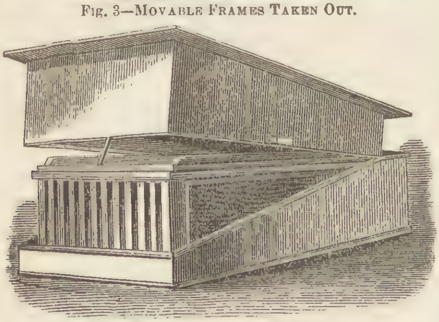


Fig. 4—Langstroth's Hive.

among them, or sprinkling them with water sweetened with sugar.)

The next step was an addition to the cross-bar, of a frame to surround the comb, the edges of which are attached to the two vertical pieces that pass down inside the hive, but not touching it, instead of the sides of the hive. (Fig. 2.)

As this frame is supported by the rabbeting at each upper corner, it can be taken out without difficulty; but as all the combs had to be removed before access could be had to the last one, it was found too tedious an operation for general adoption.

To the Rev. L. L. Langstroth belongs the merit of introducing to the American public a hive accessible to these frames, by opening the top. Patented in 1852. Any comb, properly made, could be selected and removed at pleasure. (Fig. 3.)

He has several forms to his hives, all made on this principle. The one figured here is the usual mode. (Fig. 4.) It is made double; the inside, or hive proper, is of glass on three sides. The top movable, on which are placed the surplus boxes, and to be removed whenever the frames are taken out. The whole is inclosed in a case

connected with all other parts; bottom fast to the hive, cover to boxes connected by hinges, &c.

In some respects this, having all fast together, is a convenience; it can be taken up and put down anywhere; it is always complete; and yet it sadly interferes with many operations. When the hive is separate from the bottom, and can be raised, we can clean off the filth from the floor easily; the strength of the colony is readily ascertained by looking at the bottom of the combs, and the presence of the moth worm is often first indicated by the appearances on the bottom board. These little things need looking to many times in the course of the summer, and are quite sure to be neglected—by some bee-keepers at least—if the combs are to be lifted out before an examination can be made. But the movable comb hive need not necessarily be fastened to the bottom. There are many forms of movable combs, beside those given by Mr. Langstroth. One made according to the following directions, will combine all the essential qualities of those costing much more. It has been used to some extent, and those who are satisfied with a plain, simple hive, will hardly be able to do better with any other one of its class.

The boards to construct it should be 12½ inches wide, and one inch in thickness; cut two lengths, two pieces 21½ inches and two 12 inches long; the shorter pieces are rabbeted out on the inside upper edge a half inch square, to receive and support the ends of the frames. The pieces are now thoroughly nailed together, making a box without top or bottom, the inside just 12 by 19½ inches square, and 12½ deep. In one end is made an entrance 4 inches long by ¼ deep at the bottom, and an inch hole for another, half way to the top. A strip of wood, ¾ inch thick by 2 inches wide and 14 long, is nailed across each end at the top as handles. If desired, these handles may be mouldings, with more added to the sides, to make a better finish. The frames for the inside consist of five pieces: one, triangular, 1 inch wide, 18 inches long; one, 20½ inches long, 1⅛ wide, and ¼ inch in thickness. The second is nailed to the first, having each end of the longest project 1⅛ inches beyond the other. Two pieces for the ends, 11 inches long, ⅞ inch wide by ¼ in thickness. For the bottom, a piece ⅞ wide by ⅜ thick and 18 in. long, to correspond with the triangular one at the top. Drive the nails through the short strips. When together we have a frame in this shape, 18 inches long by 10 deep, inside. Fig. 5.

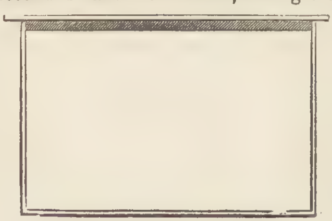


Fig. 5.

This will go down into the hive and leave a space between the end of the frame and end of the hive. The strip that is nailed to the triangular one will rest on the rabbeting and support it, touching no other part of the hive, (as seen in fig. 5.) Eight of these will be needed in a hive 12 inches wide—

1½ inches being the right distance from center to center. To keep them the right distance apart at the bottom, a small strip ⅜ by ¼ inch square is put across the middle of the hive, ⅜ inch from the bottom, with wire braces in this form (fig. 6.) Two small mortices, ¼ inch deep, on each side, will hold it. It may be put in after the hive is together, by bending it a little. Very small annealed wire will answer. Cut it in pieces, long enough to reach through and turn over to the upper side, which will hold them firmly. The points or angles should be just 1½ inches apart, and correspond with the spaces between the frames at the top.

Fig. 6.

The top can be made of whole boards, but it is apt to warp, even when clamped, and is much better when constructed of several pieces, thus: Two pieces are cut 21½ inches long by 1½ wide, the others 11 long; two of the latter, 6 inches, and two 4½ wide. The nails are driven through the long narrow strips edgewise into the ends of the boards. Around the edge is a rabbeting half an inch in depth and width.

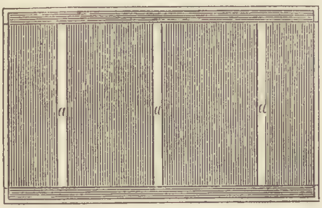


Fig. 7.

The open spaces, *a. a. a.* (fig. 7,) are passages for the bees into the surplus boxes, which set on the spaces with corresponding openings in the bottom of the boxes. These boxes may be the same as for any other hive. To protect them and shut out the light, a close fitting cover or cap is necessary, six or eight inches deep, and large enough square to fit the rabbeting in the edge of the board. The top of this cover may receive a molding or be left plain—this is a matter of taste.

The large surface at the top gives room for a greater number of surplus boxes than many other hives, which occasionally is quite important. The frames being long a less number will suffice, and as a long one can be made as quickly as a short one, there is some gain in making. Other advantages of this shape, in relation to the winter stores, are not mentioned.

The smooth whole combs that are made in frames, without passages through them, are not as well adapted to wintering bees in the open air as the old box hive with cross sticks, on the under side of which the bees usually leave an opening.* To remedy this, there seems to be no better way than to take out the combs at the approach of cold weather, and cut out a hole near the center of each. Any contrivance dividing the frame with bars in which was made a passage permanently, does not operate so well. Even the long frames, when divided, have not proved satisfactory. Another difficulty with all these

* These remarks apply to all movable comb hives.

hives, is to always get straight combs. The bees follow an angle when sawed smoothly, much better than when roughly done, yet with all possible pains some of the combs will be made crooked, and those that are straight will be unequal in thickness, making it difficult, and sometimes impossible, to raise out the frame. The guide comb, when to be had, should be used. To obviate this difficulty, Mr. Underhill has constructed the leaf hive, (fig. 8,) from which combs can be removed when irregular, and even quite crooked. The frames are not connected with the hive at all, but stand on the floor inside. On one side is a pivot that passes down through the floor, and supports them upright. To operate, one side of the hive is removed; it is then moved back, or away from the frames, leaving them exposed. These, turning on a pivot, and swinging like a door sideways before they are lifted out, do not interfere with each other when a little out of straightness. A hive with these conveniences, of course, is a little more expensive to construct than the plain one just described.

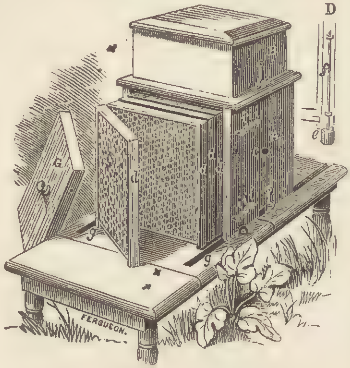


Fig. 8—Underhill's Leaf Hive.*

There are still several other patent or movable frames, but as they involve no new or important principle, it will be unnecessary to describe further. None are, as yet, perfect. But any one of them, probably, with all its defects, is superior to the old box. A bee-keeper, well enough posted on the nature of the bee to take advantage of all the facilities that are offered by them, can hardly afford to do without some one of them.

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* A. is the hive made in the usual manner, with the ordinary box, B., on the top, and proper holes, c. c., for the entrance of the bees. The frames, d. d. d. d., made in the manner described, are connected by a pivot to the table in the manner represented in D. A wooden pin, e., has inserted firmly into it the wire rod, f., which passes through staples in the frame, so that the frame may swing on the rod, as a door swings on its hinges. The hive, A., slides in the grooves, g. g., of the table, so that it may be pushed back from around the frames as shown in the cut. When it is desired to examine the interior of the hive, the box, A., is pushed away from the frames, when these may be turned gently outward on their hinges, so as to separate them from each other, and if one of them is found to be filled with honey, it may be removed without any damage to the comb, and its place supplied with an empty frame. A strip of tin a quarter of an inch in width projects vertically downward along the middle of the upper part of the frame, to induce the bees to make their comb in a straight line, a plan which was discovered by accident, and which is found to be perfectly successful in practice. The capacity of the hive inside may be adjusted to the size of the swarm by means of the movable slide, G. A series of holes are made, and stopped by the movable pins, i. i. i., and the slide, G., is pushed in as far as desired opposite any of these holes, when pins are inserted to hold it in place; the proper amount of frames, of course, being removed to make room for the admission of the adjustable slide. When the hive is closed, the box, A., is held in place by means of a hook and staple.

SUMMER PEARS—OLD AND NEW SORTS.

The improvement of the pear, and dissemination of many new and excellent varieties, are marked features in the progress of pomology. Forty-three years ago, William Coxe described sixty-five sorts, in the best and most complete American work known at that time. Yet out of this number, only about four sorts are now regarded as worthy of cultivation, namely, the

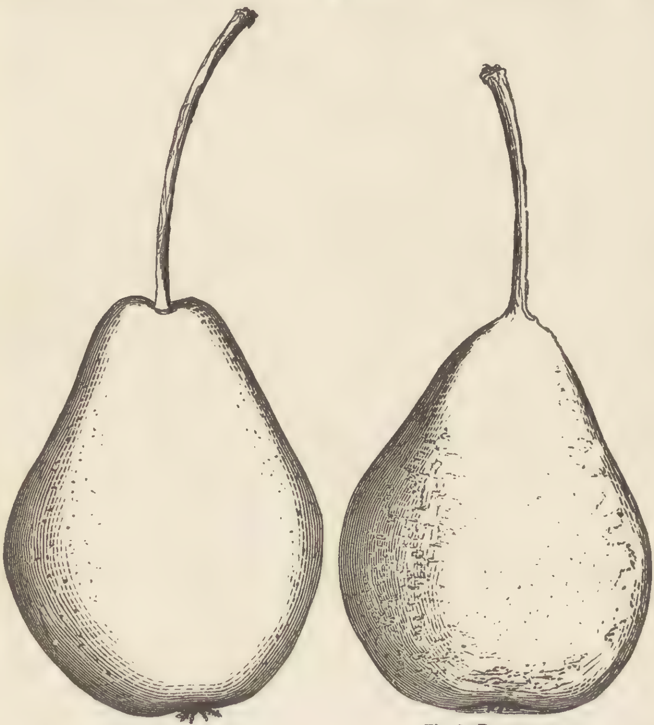


Fig. 1—Skinless. Fig. 2—Rostiezer.

Madeleine, Skinless, (fig. 1,) Seckel and Virgalieu or Doyenné. We have since added, equal to these as an average, the Summer Doyenné, Osband, Giffard, Brandywine, Tyson, Rostiezer, (fig. 2,) and Bloodgood, for summer; Bartlett, Ananas d' Eté, Kirtland, Washington, and others, for early autumn; for other autumn varieties we have such fine ones as Flemish Beauty, Anjou,

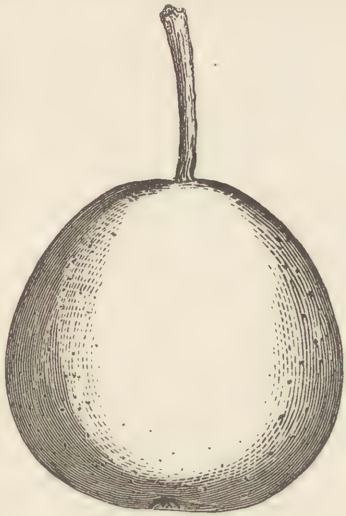


Fig. 3—Doyenne d' Ete.

Fig. 4—Osband's Summer.

Belle Lucrative, Bosc, Autumn Paradise, Nouveau Poiteau, Urbaniste, Louise Bonne of Jersey, Superfin, Sheldon, Lawrence, Buerré Hardy, and others. And yet nothing has been found equal to the Seckel for high flavor, nor to excel it for general hardiness; and for general value. where it is not liable to crack, no new sort scarcely equals the Virgalieu.

In order to assist our readers to make good selections, it is well to name not only good varieties, but those that have been rejected as of inferior value. Some think they have "the best pears in the world," till they see and know of better. We have had the old French Jargonelle sent hundreds of miles, as a new and valuable sort, "very superior," because the honest cultivator was not familiar with our delicious early varieties; and the Summer Bell and Bonchretien are still sometimes eagerly asked for of nurserymen.

The very best early pears—ripening at the same period—and about the time that farmers usually begin to cut their wheat, are the *Madeleine*, an old sort, and *Summer Doyenne* (Doyenné d' Ete, fig. 3,) a new one. Each sort has its admirers. Some have pronounced the Madeleine the best; it is larger and more melting, while the slight grain of acidity makes it very agreeable as a summer fruit. But it is not so

Fig. 5—BEURRE GIFFARD.

productive as the Summer Doyenné, the tree is not so hardy, and is more subject to fire blight; while the Summer Doyenné, although less juicy, has undoubtedly the highest flavor. On the whole, the votes preponderate in favor of the latter.

Osband's Summer, (fig. 4,) ripens a week or two later than the preceding, and is valuable for the hardiness and fine growth of the tree, its even bearing, and the fair appearance and good quality of the fruit—although not of the highest flavor. *Bloodgood* ripens nearly the same time, is about the same size as the Osband, is often superior to it in flavor, but sometimes falls below, being somewhat variable; and the tree is slow in growth. Nearly or quite equal to Osband's Summer, and a little later, is the *Sanspeau* or *Skinless*, (fig. 1,) an old variety, whose merits have been too much eclipsed by newer sorts. It is remarkable for its handsome and free growth, and for growing well in different soils—probably no pear thrives so well as this on such as are light or sandy—for its great productiveness, and for the uniform quality of the fruit. It has almost a glossy smoothness, and a very thin skin; whence its name. If it were a new sort, " far brought and dear bought," it would have many admirers.

The *Beurre Giffard*, (fig. 5,) would stand at the head of summer pears, (next preceding in maturity the Rostiezer and Tyson,) if it was a free grower. It is almost as bad in this respect as the Nelis among later varieties. The growth is slender, crooked, and feeble. The peculiar purplish shoots, and the long slender leaf-stalks, enable the cultivator to recognize it very readily among all other sorts. The pear itself is of very high quality—rich, juicy, melting, and perfumed. It is of full medium size, and the tree a good bearer. Notwithstanding its poor growth, it must stand as high as any kind of its season, which is about the same as Osband's Summer and Bloodgood, or a little later.

About the same season, there are several other summer pears, of various degrees of value:—*Dearborn's Seedling* is a rather small pear, mostly of high quality, but in some places of little value. It is a handsome grower, and an early and good bearer. Notwithstanding its smallness, it may be regarded as worthy of a place in large collections. The *Zoar Beauty*, a native of Ohio, is a fruit of moderate flavor, but the fine growth and productiveness of the tree, and the handsome appearance of the fruit, render it worthy of attention. It grows freely as a dwarf, and the fruit on our trees has been three inches long, and two and a half in diameter. It is subject to rot a; the core, which may be prevented, as in all other summer pears, by early picking and house-ripening. The *Limon*, a Belgian variety, is a small obovate fruit, buttery and melting in texture, and usually, not always, with a high "very good" flavor. It should be in large collections.

Fig. 6—Tyson.

Immediately after the preceding, or near the close of summer, several fine pears ripen. Among these the *Rostiezer* (fig. 2) is undoubtedly the highest flavored. It holds the same rank among summer pears as the Seckel among those of autumn. Unlike the Seckel, however, it is a strong grower, and it makes a handsome and productive tree. The fruit is a little below medium in size, juicy and melting, rich, sugary and perfumed. We have never heard any one object to its flavor. Equal in general value, but not quite so high flavored, is the handsome and excellent *Tyson*, (fig. 6.) It is a fine, upright grower, larger than the Rostiezer, and of uniformly good quality. It is a tardy bearer on pear stocks, although ultimately quite productive. As a dwarf, it bears early and profusely. The *Ott*, (fig. 7,) a new Pennsylvania pear, a seedling of the Seckel, is a rather small, and delicious late summer sort. The tree is a moderate grower. The figure which we give is drawn

from an unusually large specimen, grown on the grounds of Ellwanger & Barry, of Rochester. The *Pulsifer* (fig. 8) is an Illinois variety. The tree is an upright and vigorous grower; the pear about medium in size; it is melting and juicy, and if well ripened is "very good." The *Brandywine* is one of the best late summer pears, and originated in Delaware county, Pa. It

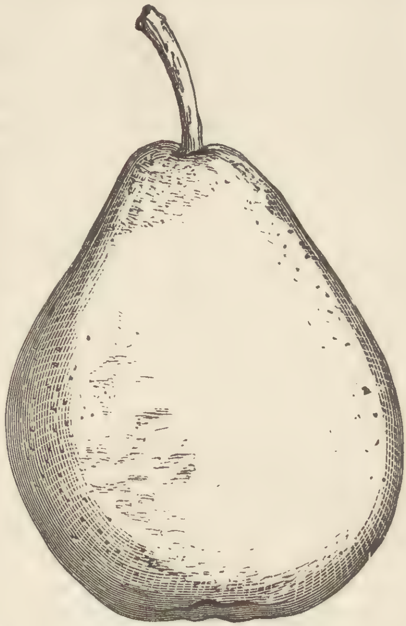


Fig. 8—PULSIFER.

Fig. 7—OTT.

is a vigorous and handsome grower, both on pear and quince. The fruit is full medium in size, but rather dull in appearance. Its quality is usually "very good," although sometimes inferior. *Manning's Elizabeth* is a beautiful and very good fruit, but too small to become a great general favorite. *Moyamensing*, of Philadelphia origin, is a vigorous and productive tree, with an irregular, obovate, rough or knobby fruit. It is "good," sometimes "very good," but must be taken at

exactly the right time in ripening, or, as Dr. Brinckle, who introduced it, once remarked to us, "it should be eaten by the chronometer."

There are some old summer varieties, that may be worthy of a passing notice. *Amire Joannet* is the earliest known pear, ripening a week before the Madeleine; it is very small, rather handsome, and the tree a free, upright grower and early bearer. We consider it, however, as entirely unworthy of cultivation; for although sometimes tolerably good, it is more usually dry, mealy, poor, and worthless. The *Little Musk* or *Primitive*, is a week later, even smaller than the preceding, but a profuse bearer, and better in quality. It is but little or no earlier than the Madeleine and Summer Doyenné, and is therefore rejected. The *Muscat Robat* is larger, better, and later, but has not good qualities enough to render it worthy a place with the best sorts. The *Sugar-top* is about the size of the Madeleine and ripens with it, but the flavor is poor. It is admired, however, by those who never saw a good summer pear. The *Jargonelle*, one of the best of the old sorts, matures two weeks after these, and if picked early and house-ripened, so as to prevent the core-rotting to which it is so liable, is often of quite good quality; to some its agreeable acidity renders it a favorite. Nearly all persons would, however, greatly prefer the Bloodgood, Giffard and Osband, which are nearly as early. The *Julienne* was formerly highly prized, but is not now cultivated in the Northern States. In the South, it is greatly improved both in size and quality, and is one of the very best early pears for that region, ripening, along the borders of the Gulf of Mexico, before midsummer. No sort is equal to it for early bearing, nothing being more common than to see small trees in the nursery row bending under loads of fruit.

THE VALUE OF ORCHARDS.

Those who are about to prepare the ground and set out orchards, have mostly very indistinct views of their real value. They know that good fruit sells in market, but they have never made any defined estimate of the probable income from ten acres of well selected, well planted, and well cultivated trees. Whether there will be an annual return of a hundred, five hundred, or five thousand dollars, they have never carefully figured; and those who have made calculations have perhaps greatly erred as to the probable amount to be reasonably expected, for want of reliable data.

Apple orchards are the most certain and reliable, and their profits are very high. There is always an extensive market for good apples, because they are useful for every day food, and are within the reach of all. When more skill is generally acquired in picking and keeping, the market will increase, because there will be less loss by decay on the part of the purchaser.

Forty years ago, good winter apples sold for 25 cents per bushel at the orchard; and it is remarkable that notwithstanding the millions of trees which

have since that time been set out, and the changes which have passed over the country and its people, the price has not at any time greatly varied from this sum. During scarce seasons it has been higher; and when the crop has been abundant, market has not been found for all; but even in the latter instance, selected fruit, from thrifty, well managed orchards, would always command a ready price, and at higher rates than the average, by special contract. Rare or fancy sorts, (as Northern Spy, Lady Apple, &c.,) would often sell for several times more than that we have mentioned, but we do not take these into the account.

What, then, is the value of a good, well managed apple orchard, per acre, and at different ages in growth? If well cultivated, the trees may be regarded as full grown at fifteen years, and they will continue to bear from 30 to 50 years more. Casualties, or danger of dying, would not exceed 10 per cent., the owner spending not over one dollar per acre yearly, in destroying borers, caterpillars, &c. The crop will vary with seasons, but on good trees of properly selected sorts, the average will be eight bushels yearly. (In abundant seasons it will be frequently three times as much.) Forty trees per acre, will give 320 bushels. At 20 cents per bushel, on the tree, an acre will yield $64. Deduct 10 per cent. for casualties, 10 more as allowance for the limited duration of the orchard, and $1 for assaults on insects, and the yearly return will exceed $50. This is the interest, at 7 per cent., on $700 per acre—or $17.50 per tree—which may be fairly reckoned as the true value of the best orchards. Poor ones, uncultivated, unpruned, enveloped in suckers, and of unsaleable or unproductive varieties, would be indefinitely lower. (We have sold a good orchard at $600 per acre, and the purchaser was abundantly satisfied.) The *cost* of such an orchard may be easily reckoned. The 40 trees, and freight on them, $10; transplanting, including thorough preparation of the ground, $8; land, say $100 per acre; total, $118. The crop of potatoes, beans, turnips, &c., among the trees, until they are grown, or begin to bear, would pay interest on the land. The net profit, therefore, per acre, would be $582.

The orchard at eight years, or half grown, would not produce more than one-fourth or one-third the amount in eight years more, but in view of its constantly increasing value, it would be safe to estimate it at half price.

These estimates, it must be particularly observed, are for well selected and *well managed* trees. It would be safer not to make any estimate or calculation whatever, on neglected ones, such as nineteen-twentieths are, of all that are set out.

Peach orchards. Estimates on peach orchards are more difficult, because the crop quickly perishes, and more knowledge, care and skill, is required in marketing. The market. as well as the crop, is more uncertain, and the trees are of shorter life. In some places, they will not live over 10 years; in others they endure 20, and with good management, 30 years. The fruit of the finest sorts may sell for 50 to 150 cents per bushel, on the tree; and in

the best localities, such as along the south shore of Lake Ontario, the crop will be good three-fourths of the seasons. If trees yield a bushel yearly, as an average, they may be estimated at the lowest at fifty cents yearly per tree, and two hundred trees per acre, (15 feet apart,) would give $100 yearly—the interest on $1,400 per acre. Deduct 50 per cent. for casualties and short life, and the value would be about the same as for an apple orchard, for trees just coming into good bearing, in localities where they grow and bear best. This estimate is much at random, will be thought by many as too low, and will vary greatly with circumstances.

Pear orchards, are either good for nothing, or so profitable as to present apparently fabulous estimates. If standards, the trees are more difficult to transplant successfully than the apple and peach; and if dwarfs, which are very easily transplanted, better cultivation is required than nineteen-twentieths of the owners are willing to give them. But when in good bearing condition, if intelligently managed and marketed, the profits are very heavy. Single standard trees, with but little care after they are full grown, have yielded, for a series of years, from $20 to $30 annually. A hundred such per acre, (20 feet apart,) allowing 50 per cent. to fail, would be $1,000 to $1,500, which, allowing 50 per cent. more for casualties and limited duration, would be $7,500 to $10,000 for the ten acres. This would not be an extravagant estimate for well selected, well managed trees, and skillful marketing. For neglected trees, of poor sorts, it would be about $7,500 to $10,000 too much.

The long time required to raise such an orchard, is the reason there are so few, our people being either too impatient for so long a delay, or, which is a still more frequent reason, entirely unwilling to give them the attention they should receive during the early stages of their growth.

Dwarf pears are transplanted with facility, and a young orchard is easily started; but very few ever arrive at good profitable bearing condition. This is owing to several reasons; a prominent one is, that it is nearly impossible to induce the owners to give them a mellow, cultivated soil. When the essential requisites of good management are regarded, and the locality has been a favorable one, the best results have followed. Ellwanger & Barry, T. G. Yeomans, W. P. Townsend, T. R. Austin, and others, have obtained from their dwarf pear orchards various sums, ranging from $400 to $2,000 per acre, in favorable seasons. One of these, which yielded in a single year $500 from one-fourth of an acre, was simply manured, and cultivated with two horses abreast, between the rows, at less cost than is required for the culture of corn—the whole probably not amounting to $3 for the quarter acre. Neglected, as most orchards are, they would not probably have afforded $10; consequently, the nett profits of good management were over $480. In the instance here mentioned, the crop sold for $14 to $35 per barrel, and well grown fruit may be safely reckoned, at any time, at the lowest, at $2 to $3 per bushel, on the tree. We may estimate the value of an orchard, therefore, as follows: Average product of good trees, of the best sorts, one bushel;

number of trees, per acre, 600; product in dollars per acre, annually, $1,200 to $1,800. Making allowance of 50 per cent. for liability to fire-blight and other disasters; and then 50 per cent. more for limited duration of the trees, and the yearly income would be about $350, which is the interest on $5,000 per acre—a fair estimate of the real value of a good, well treated acre of dwarf pears, just coming into full bearing.

TRAINING WEEPING TREES.

WEEPING Ornamental trees are often allowed to grow irregularly, and of some sorts the branches become too drooping, and present a less ornamental appearance than when pains are taken to give them a symmetrical form.

Fig. 1.

Fig. 2.

For example, Fig. 1 shows the common way in which the new weeping willow is left to grow of its own accord; and fig. 2 is the same, trained into a fine umbrella shape, by means of hoops tied beneath, at the places indicated by dotted lines. The branches in a few years become stiff enough to support their own weight, and the hoops are then removed.

REMOVING LARGE TREES.

FOR common practice, and with good cultivation, it is now fully established that small trees, well removed, will become larger and better with a few years growth, than when transplanted of large size. In transplanting from nurseries, small trees are therefore selected by skillful cultivators. There are cases, however, where the removal of large trees becomes desirable—such, for example, as thinning out plantations, or transferring trees from one part of the same grounds to another. To do it imperfectly, or by mutilating the trees in a hasty manner, would be no better than throwing them at once away. A large mass of the roots must be carefully secured, and this cannot be done without conveying with them a large ball of earth. Nor should the operation in any instance be performed on such as are more than three or four inches

in diameter, and twenty or twenty-five feet high. The operation succeeds better with evergreens than with most deciduous trees, on account of the more circumscribed and denser mass of fibrous roots. It is commonly performed in winter, with a frozen ball of earth; but if done in spring, it is equally successful, and the labor is not one-half that of cutting frozen earth.

One of the simplest and easiest modes of removing the trees that we have met with, is that practiced by W. P. Howland, Esq., of Aurora, N. Y., who has carried evergreens twenty feet high or more, with half a ton of earth on the roots, with the labor of two men and a single horse. A large number of trees were thus removed, and so successful was the work, that, supplied as they were with mellow and rich earth outside the balls, they actually grew more the following summer than they had for any single year previously.

Fig. 1.

The trees are first dug about and completely loosened.—A piece of carpet or thick sacking is then wound about the trunk for a foot or two, to prevent any accidental chafing. An iron ring, shaped as in fig. 3, and 5 or 6 inches long, is then fastened to the trunk close to the ground, by passing through it and around the trunk, a broad strip of stout sacking—strong enough to hold the weight of the tree, fig. 4. The hinder wheels of a common farm wagon, with their axle, are then run up near the tree behind it. Chains attached to the axle, as shown in fig. 1, enable the horse to draw it, when hitched to the whiffle-tree, *a*. The long lever *b*, is then placed upon the axle, which serves as a fulcrum, and the hook at its end, (shown in fig. 2,) is hooked into the ring already mentioned. By bringing down the end *b* of this lever, (fig. 1,) the tree is hoisted out of its hole, as shown in the figure. One man holding the lever *b*, and the other driving the horse, it is carried and deposited at the exact spot desired; it is lowered into the new hole with the same ease that it was raised from its former position. After

Fig. 2.

Fig. 3.

Fig. 4.

the digging has been performed, the whole operation is completed in a few minutes, and there is no hard lifting, grunting, nor severe strain of the vertebral column, but all is done with ease, satisfaction, and precision.

Where other trees stand thickly, and in the way, the pole may be first set upright against the side of the tree, and both tied together a few feet from the ground; then by bringing both down horizontally, the tree is drawn off without interfering with others. A rope attached to the end of the pole will enable the operator to lower it easily.

FORTUNES SUNK.

We know a farmer over sixty years old, who has worked hard for more than forty years. He began with a good 150 acre farm given him, but subject to an incumbrance of about one-third its value. This was a good start. He is, after a lapse of forty years, still in debt. He is temperate; had he not been, his farm would have gone long ago. He has worked hard; had he not, he must have failed. He has been economical, in its common meaning, or he never could have kept even with his creditors.

What, then, has kept him back in the world? We have figured up, and found that he has virtually sunk three good estates, by a want of management.

First. In wintering his cattle and sheep. He kept, generally, about 20 cattle and 100 sheep. The cattle trod about three tons of hay under foot each year, and consumed half a ton each extra by exposure to the winds, in all 13 tons, worth $91. This exposure of cattle and calves reduced their size and market value one-third—annual increase, 6 head, and average value lost, $8 each—$48. Ten per cent of his sheep and lambs were lost by want of shelter, and the clip was diminished 25 per cent. from the same cause—total loss on sheep, per annum, $50. The whole yearly loss on cattle and sheep was, therefore, $189. In forty years this annual loss, with compound interest, would amount to about $35,000. Thus one fortune has been sunk.

Secondly. In a want of good rotation of crops. He raised wheat after wheat, oats after oats, and corn after corn, because the stubble was most easily plowed, till his land was exhausted, and full of weeds. The crops, as a whole, scarcely paid his labor. A good rotation would have safely given him one-third more, which would have been a clear gain, on an average, of at least $5 an acre, on about 50 acres, yearly—total, $250 a year. This loss repeated for 40 years, and interest, would amount to more than $50,000! This was the second fortune sunk.

Thirdly. In raising crops of weeds. Some of his pasture fields had a a heavier growth of mulleins, rag-weed, johnswort, and thistles, than of grass; consequently, at least half his land was wasted to grow them. On 50 acres

of pasture, at least $2 each were yearly wasted, to say nothing of the loss of grain by the Canada thistle patches, in retarding growth and preventing clean harvesting, and his greatly diminished crop of corn by fox-tail and pig-weed. The annual loss from weeds was, therefore, at least $100—the amount of which, with interest, in 40 years, would be $20,000. The third fortune.

There are several other items of bad management that might be added, but these will do at present.

If any one doubts these estimates, let him examine carefully the amount raised by one of our best and thriftiest farmers, and from this amount deduct what is produced by a poor manager; then calculate compound interest, adding in the yearly loss, for 40 years, (the period of active business,) and he will probably find that on 150 arable acres, not merely the $110,000 have been virtually sunk, but a much larger sum. If, however, the yearly loss should be much less, all we ask is that the reader may take that diminished amount and go carefully through the calculatiou, and he will doubtless perceive why some men get rich at the business and others do not.

FRUITS AND FRUIT CULTURE.

Rules for Pruning Grapes.

Hovey's Magazine gives substantially the following general rules for grape pruning, after recommending grape-growers to be free in the use of the knife, followed by the remark that where one vine is pruned too severely, nine are not pruned enough:

1st. No shoots should be nearer than one foot of each other.

2d. Prune back to within one eye of the old wood, every fall and spring, about one-half of the annual shoots—the remaining eyes producing canes to be retained for bearing next year—when the old bearing wood is in turn to be cut out, to make room for new shoots.

3d. Disbud or rub off, as soon as they appear, all shoots not wanted as bearing wood.

Directions for Transplanting.

1. First, have a good, deep, dry soil—well underdrained, if wet. Bad fruit is often caused by hidden water standing below the surface.

2. If not very fertile, it must be enriched by manure, which is best done a year or two before planting, as fresh, unmixed manure should never touch the newly set roots. Or strips of land eight feet wide for each row. may be deeply plowed with the dead furrow in the middle, (to promote drainage,) half a load or less of old manure or compost, placed for each tree, and thoroughly harrowed into the soil before setting.

3. If the ground has been well and deeply mellowed and enriched, the holes need be only large enough to receive the roots without bending; otherwise they should be five or six feet across, and a foot deep. On heavy land, inverted sods are good in the bottom. Large holes, filled with rich earth or old compost, will cause young trees to grow rapidly. Never place manure near the roots.

4. Pare off with a knife all bruised parts of the roots, to prevent decay. Place the tree no deeper than it stood before—less deep is better than more. Fill the fine earth carefully among the roots, spreading them all out with the fingers. No cavities should ever be left among or beneath the roots, and the earth may be well settled among them by pouring in water when the hole is part filled. All except small trees need staking to protect from the wind.

5. Autumn and spring are both good seasons for transplanting—except that tender trees, as peach and apricot, do best in spring, unless on a dry bottom. The autumn is the better season to procure trees from distant nurseries, even for spring planting. They may be safely wintered by burying the roots deeply in the earth, in a dry, sheltered situation. Trees should be always well shortened or cut in at the head, when set out.

6. GOOD, CLEAN CULTIVATION, IS OF THE UTMOST IMPORTANCE. Neither corn. potatoes, nor fruit trees, can flourish surrounded by weeds and grass sod.

7. Watering usually injures young trees by baking the earth. If necessary, lay the roots bare, pour on the water, and replace the earth. A rich soil, KEPT MELLOW, will not need water. Young cherry trees often die about midsummer, unless MULCHED, or with the earth about them covered several inches with old straw, or other litter. Trees dried by long carriage, may be restored by immersion for a day or two in water.

Fig. 1.

Root-Grafting the Grape.

This mode of propagation is becoming extensively adopted by nurserymen. The accompanying figure shows how it is done. The cleft is made in a short graft, and a small root, an inch and a half long, is inserted. (Fig. 1.) The parts are bound well together with strips of waxed paper, leaving a small portion of the lower end of the graft open, for the free emission of roots. They are then subjected to a bottom heat under glass, and soon make growth. They are transferred to pots once before being set out in the open ground, and they make good saleable plants by autumn. The grafting is done about midwinter, or later.

Depredators and Diseases.

MICE are excluded by banking up a foot around every tree, late in autumn—CURCULIOS, by jarring down on sheets daily, and by turning in pigs and geese—APPLE TREE BORERS, by punching to death in their holes with a small twig—and the PEACH WORM by cutting out with a knife. FIRE BLIGHT in the pear must be instantly cut off far down, and the branches burned—and the BLACK-KNOT may be kept off the plum by prompt and continued amputation, beginning in time.

Apples for the West.

The following carefully selected list of apples, for the Northern, Middle, and Southern portions of Illinois, adopted by the Illinois Horticultural Society, will apply to any of the Western States, of corresponding latitudes:

NORTH ILLINOIS.—For general cultivation. SUMMER.—Early Harvest, Carolina Red June, Duchess of Oldenburg, Keswick Codlin, Sweet June.

AUTUMN.—Fameuse, Maiden's Blush, Fall Swaar, (of the West,) Bailey's Sweet, Lowell.

WINTER.—Winesap, Rawles' Janet, Domine, Jonathan, Willow Twig, White Pippin, Yellow Belleflower, (on clay soil,) Roman Stem, Red Romanite, (of poor quality, but an abundant bearer and long keeper,) Taliman's Sweet, Fulton.

For Amateur Culture.—SUMMER.—Benoni, Red Astrachan, Early Pennock, Summer Queen.

AUTUMN.—Fall Strawberry, Holland Pippin, Fall Wine, Northern Sweet, Striped Gilliflower (or Scollop.)

WINTER.—Seek-no-Further, (Westfield,) White Winter Pearmain, Herefordshire Pearmain, English Golden Russet, Michael Henry Pippin, Swaar.

The Committee for Central Illinois reported the following lists:

For general cultivation.—SUMMER.—Early Harvest, Sweet June, Carolina June, Hocking, Benoni, Summer Pearmain, Keswick Codlin.

AUTUMN.—Maiden's Blush, Fall Wine, Rambo, Bailey's Sweet, Fall Swaar, (of the West,) Fameuse, Trenton Early.

WINTER.—Jonathan, Fulton, White Belleflower, Yellow Belleflower, Roman Stem, Domine, White Pippin, English Golden Russet, Milam, Smith's Cider, Wine Sap, Janet, Willow Twig, Limber Twig, White Pearmain, Little Red Romanite.

For Amateurs they add to the above list:

Sine qua non, Summer Rose, Fall Pippin, Paragon, American Golden Russet, Red Canada, Swaar, Pryor's Red, Æsopus Spitzenburg.

For further trial.—Red Astrachan, Red Seedy Fringe, Ragan Apple, Herefordshire Pearmain, Minkler.

The above lists were adopted.

SOUTH ILLINOIS.—SUMMER—Early Harvest, Carolina June, Red Astrachan.

AUTUMN.—Maiden's Blush, Fall Queen or Buckingham, Rambo.

WINTER.—Rawles' Janet, White Winter Pearmain, Limber Twig, Wine Sap, Yellow Belleflower, Carolina.

Selection of Hardy Grapes.

The Fruit Growers' Association of Eastern Pennsylvania took a vote on the best varieties of hardy grapes, with the following result:

	VOTES.
Concord	9
Delaware	8
Diana	7
Clinton	6
Isabella	5
Hartford Prolific	3
Catawba	3
Taylor	1
Cloentha	1
Ontario	1
Cassiday	1

Young Cherry Trees.

A large portion of newly transplanted cherry trees die about midsummer, after having appeared in leaf, resulting from dry and hot soil at the roots. Water often increases the difficulty, and kills them by making a hard crust. If water is applied at all, the earth should be first removed from the roots, and a copious supply poured on. But this too is of little use. The roots are drenched for the moment, and in a short time are as dry as ever. The only remedy is a thick, heavy mulching. If of old straw, it should be about 6 inches thick, and several feet in diameter.

High Prices for Pears.

T. G. Yeomans, of Wayne county, whose success as a pear grower has frequently been alluded to in the COUNTRY GENTLEMAN, has been very successful the past season, both in growing and selling his fruit. A Rochester paper says: "This year he has had remarkable success, and has raised some of the most magnificent specimens of fruit ever exhibited. One barrel of Duchess d' Angoulemes, which he sent to Philadelphia, contained only one hundred and twenty five pears. The fruit alone weighed one hundred and twenty-seven pounds, so that the pears averaged over a pound each. This barrel sold for $35.63, and the purchaser trebled his money in retailing it. Four other barrels sent by Mr. Yeomans, to the same market, contained one hundred and fifty-two, one hundred and sixty-one, one hundred and sixty-two, and one hundred and sixty-five pears respectively. The best eleven barrels sent off, were sold for over $300."

The Glout Morceau Pear.

On the grounds of Edward W. Herendeen, of Macedon, Wayne county, N. Y., a single dwarf tree of the Glout Morceau Pear, eight years planted, bore the past season one barrel of excellent fruit. It had received but moderate cultivation. The pears were large and fair, and ripened into a fine flavor on the approach of winter. Ellwanger & Barry, of Rochester, as we may have stated on a former occasion, have sent their crops of this pear to the New York market, where they have sold early in winter, when in fine eating condition, at three dollars per dozen.

Broadcast Cultivation.

S. G. MINKLER, of Illinois, has found that well cultivated young apple trees, set out two rods apart, meet at the roots in eight years. Hence the importance of cultivating or manuring the whole surface, instead of a small circle at the foot of the tree, as too often practiced.

Apples in Wisconsin.

The Northwestern Fruit Growers' Association have recommended the following varieties for general cultivation, in Wisconsin:—Red Astrachan, Sops of Wine, Carolina Red June, Duchess of Oldenburgh, St. Lawrence, Wagoner, Pomme Grise, and English Golden Russet. The last was very highly commended for Western culture. Early Harvest, although not hardy, yet on a firm, dry soil, with a low top, was regarded as valuable. Early Joe had proved hardy and productive, and well adapted to amateur culture. Maidens' Blush was well esteemed, but somewhat tender. Fall Orange always did well. Jersey Sweet, Rambo, Domine and Vandevere Pippin had proved too tender. Fall Wine slightly so, and very productive. The Baldwin was found to be very tender, quite unproductive, and of no value. The English Russet succeeded only on high and dry soils. The Red Romanite quite hardy, but the quality poor. Herefordshire Pearmain was highly recommended; usually hardy on dry soils, but failed on low grounds. Rawles' Janet was found to lack vigor of tree. Northern Spy succeeded well. Blue Pearmain, although hardy and good, was very unproductive. Tallman Sweet and Fameuse were both highly recommended.

Hardy and Tender Trees.

ELI NICHOLS, an experienced fruit raiser, of Ohio, justly remarks: "Some, recently, have made a great mistake, in concluding that the cold winters kill or spare trees without rule or reason. A somewhat extensive observation shows me, that where trees are good, sound, healthy, they are not killed. On well drained ground, with manure enough to give healthy vigor, the tree has lived. Treated the same, on much richer land, or with water at the roots, it died. Manuring trees on ground already too rich, has proved fatal—on poor land, it has saved the tree. On thin lands, thorough cultivation cannot injure; on rich bottoms, or highly manured lands, it may, especially if late."

Culture of the Blackberry.

Procure plants which have been propagated from cuttings of the roots, (suckers are apt to be one-sided, and destitute of small fibres,) of moderate or rather small size, as these succeed best. Plant them in a good rich soil, good enough for corn or cabbages, about four by six feet. Cultivate them well, if the plantation is extensive, by horse power, and in summer, as soon as the shoots are three or four feet high, pinch off the top to induce a thicker growth, and to send out side shoots. These will bear another year.

Dwarf Apples.

It is possible that the dwarf apple may become more popular than the dwarf pear. It is not liable to the accidents of the latter.

All sorts of apples grow freely on the dwarf stock, and it is not necessary to take that particular care in selection, founded on many years of experience—although some sorts of the apple form handsomer and better shaped heads when treated as dwarfs than others. The symmetrical growers should be selected, because they make the process of pruning simpler, and more easily give the desired shape.

Common standard apple trees occupy too much room for gardens and small places. At the commonly recommended distance, 33 feet, only 40 can stand on an acre; and placed at the nearest distance admissible, 25 feet, an acre is required for 69 trees. A quarter-acre village garden can therefore have only 10 trees at the former, and 17 at the latter named distance, if apple trees occupy the whole ground. But dwarf apples may stand about four times nearer, giving sixteen times as many trees on the quarter-acre. If, therefore, one-half the quarter-acre garden is occupied with dwarf apples, 85 trees may be planted at eight feet apart, a suitable distance for the Doucain dwarf, or 150 at six feet apart, the space for the smaller or Paradise dwarf.

The best varieties for dwarf stocks, as a general rule, are those which naturally form a round or oval head. Such will need but little pruning. Among these are the Red Astrachan, Jersey Sweet, Porter, Baldwin, Dyer, Monmouth Pippin, Summer Rose, Benoni, and Sweet Bough. There are others that incline to grow upright, and need some pruning to prevent their running upwards, and to induce spreading; among these are the Northern Spy, Twenty Ounce, Lady Apple, Wagoner, Early Strawberry, and Bailey Sweet, all of which make handsome dwarfs. There are again others, although not so handsome growers, yet the ornamental appearance of the fruit renders them desirable dwarfs, as the Fameuse, Red Canada, Carolina Red June, Munson Sweet, &c. There are still others, which grow so irregular that some care would be required to make handsome trees of them, such as Fall Pippin, Canada Reinette, and Tompkins County King. Dwarf apples should be mostly confined to summer and autumn varieties, in order to furnish a fresh supply for the table of the most desirable sorts.

Winter apples may be most profitably raised in orchards of large trees, or purchased in market by the barrel.

Dwarfs are especially desirable for those who plant new places, and consequently desire an early return. The Paradise stock will give crops the third year; and the Doucain the fourth, in abundance. A fine young collection of dwarfs, now four years planted, and growing their fifth summer, bear much better this unfavorable season, than old orchards. Some of the trees are loaded. A Hawthornden is so full that the branches densely set with apples, lie on the ground with their loads of fruit, now in the second year of such profuse bearing. The Doucain trees are about 7 feet high, and the Paradise 5 to 6 feet. The soil is fertile, and always well cultivated.

Transplanting Strawberries.

The best time for transplanting strawberries is early in the spring—the operation is then easily performed, and nearly all the plants will live and grow; and if they are of productive sorts, they will bear a small or moderate crop the same season.

The next best is just after bearing, or about midsummer. But more care and labor is then required, and some of the plants are apt to die. All the large leaves must be taken off, leaving only the young or opening ones—the roots should be previously dipped in mud and and then spread well out at setting—the earth settled about them by pouring in some water, and the surface mulched with an inch or so of fine manure, being careful not to cover the crown of the plant. They will grow considerably, and bear the next year.

Setting out in autumn succeeds well if the proper requisites are attended to; but carelessly done, usually fails. The earth should be well packed, or trodden hard, about the plants, or the freezing will lift them out and kill them. They should be of hardy sorts, to endure the winter; the Wilson is especially adapted to this purpose. And they should be protected by a covering that will not settle down compactly on the plants and smother and destroy them. Fresh moss is perhaps the very best thing for this purpose, or the leaves of evergreens, or rather the small shoots containing the leaves. With this care the plants will keep well and start early; without it they will very likely be thrown out and frozen to death.

Varieties inclining to be tender, as the Hooker and Hovey, are not well adapted to autumn transplanting.

The principal advantage of this season is for plants that have to be carried a long distance, or from a remote nursery, from which a supply could not be obtained early enough in spring.

DOMESTIC ANIMALS.

The best Doctor for Animals.

We have seen a great deal of doctoring for sick animals—some successful, and a great deal of it unsuccessful—and we have long since come to the conclusion that the most skillful physician that we have ever met with is Doctor NURSE. If an animal, (as well as human being,) is not carefully taken care of, nursed, all the medicine in the world can do but little good. And, on the other hand, with good nursing, medicine is generally unnecessary. Our own observations lead to the opinion that in at least nine cases out of ten, as commonly administered, medicine does more harm than good.

An eminent New-York physician said that taking medicine was always a choice of evils—that, being poisons in nearly all instances, they necessarily did harm to the system, and were never to be employed unless there was a strong probability that they would benefit more than injure. This is not the rule adopted in doctoring horses, by most horse jockies and others having care of these animals, if we might judge from the way in which gunpowder, salts, red pepper, turpentine, whiskey, corrosive sublimate, and other violent remedies, are administered at hap-hazard, increasing in nearly all cases the violence of the disease. It may be laid down as a general rule, that it is much safer to give too little than too much medicine; and that none should be given unless we know distinctly how it is to operate, and what it is for.

Some years ago, a valuable horse caught cold, and was troubled with a cough so severe that he might be heard half a mile, and which appeared to be rapidly reducing his flesh. We had an abundance of prescriptions from neighbors, of all kinds of frightful medicines, enough to have killed him had he been in perfect health. We concluded to discard all, and to place him under the attention of Dr. NURSE. Great care was taken never to work him to perspiration—he was blanketed whenever the weather was chilly—he was fed regularly and moderately on succulent food, all such food partaking of the character of expectorants, and favoring a free discharge from the lungs—and all his other wants were observed as well as we were able to, and promptly supplied. In six weeks he was perfectly well. Had some nostrum been employed, it might have injured him, and prevented recovery; or if it had not, Dr. Nurse might not have been called in; but if he had, and the medicine had not greatly retarded his recovery, and he had got well in six months, it would unquestionably have been regarded as an extraordinary cure.

At another time, a valuable mare, eleven years old, was badly sweenied by hard work, the worst case of sweeny we ever met with. It was generally regarded as a hopeless case, but various remedies were proposed and offered, costing from $20 down to $3. We concluded that our old friend Dr. Nurse should be again called, to the exclusion of all these fellows, and the consequence is, that with simply careful, moderate treatment, the animal is well, and the sweeny filled up.

The majority of sick horses get well; every owner tries some remedy; and that particular medicine that he happened to be using at the time, gets all the credit—although, as a general thing, it retarded more or less his recovery.

We must make one exception in the general rejection of medicines—there is one, which if given moderately can scarcely ever injure, and may often do much good. This is powdered charcoal—a powerful antiseptic, and absorbent of bad matter, while, unlike most other medicines, it does not irritate—a most important advantage. A clear illustration of this advantage recently occurred in the case of a fine calf five months old, which had become bloated by eating too many apples, blown down by a violent gale. Its sides became distended by wind to an almost incredible size; a solution of saleratus was poured down its throat repeatedly, and as often thrown out violently, on account of its irritating action on the throat of the young animal. It continued for eighteen hours, with little or no improvement, when a large tablespoonful of powdered charcoal mixed with half a pint of water, was given. The dose was swallowed without any difficulty, and in four hours the calf appeared to be perfectly well. Charcoal may be given in nearly all cases of derangement of the digestion, whether with men or beasts, with great advantage. One-half to a teaspoonful is a full dose for a man, and as much more for an animal as its food exceeds that of a man.

We do not mean to say that there are not other medicines that do not occasionally prove eminently useful; but unless they can be given understandingly, with a full comprehension of their mode of action, and with an undoubted knowledge of the exact nature of the disease—and their use sanctioned by very clear and distinct previous success—it would be much safer to discard them.

Shropshire Down Sheep.

In former numbers of this work we have given portraits of most of the prominent breeds of sheep. The above engraving represents a breed—the Shropshire Downs—now rapidly coming into notice and repute in England. They are originally descended from a hardy mountain breed, through which they inherit an excellent constitution. This enables them to thrive on some of the most exposed districts; while on more fertile pastures they evince a rapidity of growth, and natural tendency to a heavy weight at an early age, certainly not surpassed by any other breed. We have had the cut drawn and engraved from a fine plate in a recent number of the Farmers' Magazine—which speaks of the sheep themselves as admirable for "splendid quality of meat, broad chines, and full plaits, and wonderfully good loins and rumps."

Wintering Sheep.

The three great requisites for successfully wintering sheep are, 1, good and regular water and food; 2d, good, clean shelter; and 3d, keep them in small flocks. The following is the method adopted by ROBERT J. SWAN, of Geneva, N. Y., one of our best farmers:

I consider, for my fattening sheep, the best mode is to have good deep sheds, (34 feet,) racks to receive their straw or hay, and troughs to feed their meal in, and keep the yards well littered with straw. We feed, to fattening sheep, two bushels of corn or two bushels of oil cake meal, to the hundred sheep, with plenty of good bright wheat straw three times a day, till the 1st of March, at which time we give them hay, in their racks, three times a day, and one bushel of corn or oil meal per day per hundred. My store sheep we give plenty of bright oat or wheat straw in racks, three times a day, and one bushel of corn or oil cake meal per day per hundred, till the 1st of March, at which time I give them hay and no grain, but always take good care to see that all my stock yards are well littered with straw. My lambs I feed hay three times a day, and three pecks of oil meal or corn meal to the hundred. All the yards well supplied with water.

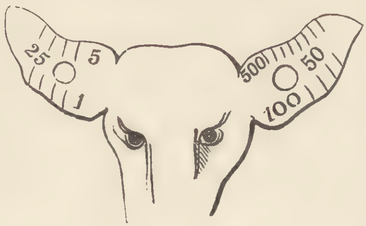
I never lose my sheep in winter, but more in summer, and those the fattest and the best—about two per cent.—Judging from what I have noticed, on Mr. Johnston's farm, I think the fine wooled sheep less subject to disease than the coarser breeds. Where small flocks of coarse wooled sheep are kept, I think them healthier than those kept in larger, or in moderate sized flocks. Having been a pupil of Mr. Johnston, I adopted his course of farming, both in cultivating my farm, and fattening my sheep.

Training Cattle to Jump.

A western farmer says he makes it a rule that whenever cattle are made to pass a fence, whether through bars or "slip-gap," to leave one rail for them to pass under. This gives them a downward tendency, and lessens their inclination to jump or look upwards, as they are sure to do when a lazy attendant throws down a part of the rails, and makes them vault the rest. Cattle may be learned to go over any fence, by the careful training they often get for this end, and performed as follows:—First starve them, or give them poor feed, which will make them light and restless. As soon as they go over the lowest part of the fence after better provender, make them jump back again, and put on one more rail, saying, "I guess that will keep 'em out." Next day, (as of course they will be in mischief again,) repeat the process, adding another rail; in a short time they will take care of themselves, and harvest the crops without charge.

To make Horses Canter Slowly and Gracefully.

Col. PRATT, who has owned great numbers of horses, teaches them a slow and easy canter, under the saddle, by riding them long distances up hill.



Registering Sheep.

The above cut illustrates the German mode of ear-marking and regularly numbering the sheep belonging to a flock, so that each individual can be distinctly registered:

Each slit in the lower rim of the right ear represents	1
Each slit in the upper rim of the right ear represents	5
Each slit in the lower rim of the left ear represents	100
Each slit in the upper rim of the left ear represents	500
The central hole in the right ear represents	25
The central hole in the left ear represents	50

In the above figure:

7 slits in the upper rim of the left ear, 500 each	3,500
4 slits in the lower rim of the left ear, 100 each	400
The central hole in the left ear	50
4 slits in the upper rim of the right ear, 5 each	20
4 slits in the lower rim of the right ear, 1 each	4
The central hole in righht ear	25
Number of the sheep	3,999

Bringing Sheep out of Winter.

The Ohio Cultivator gives the following as Gen. LAHM's mode of preparing for spring—the most difficult season for sheep. It is well to feed animals well on the approach of such a season, but it is still better, easier, and safer, to give them good and regular food, and good management all the year round:

Our lambs come from the 20th of April to the middle of May and that the ewes may be strong, and have an abundance of milk, we commence to feed a little bran and oats in March, and continue it until they get a sufficiency of grass. A ewe in good condition, and with a good flow of milk, seldom gives the shepherd any trouble, but the reverse with the sheep, the reverse with trouble. More than this, a lamb raised by a half-fed ewe, is not worth anything when raised. Ewes should not be fat, but in good condition; and for several weeks before the lambs come, the ewes should be fed with a view to have a sufficient quantity of milk for her lamb. There is nothing better for this purpose than oats and wheat bran, with good hay or corn fodder.

To Prevent Horses Kicking.

Having a horse that would kick every thing to pieces in the stable, that he could reach, and having found a remedy for it, (after trying many things, such as fettering, whipping, hanging chains behind him for him to kick against, &c.,) I send it to you. It is simply fastening a short trace-chain, about two feet long, by a strap, to each hind foot, and let him do his own whipping if he cannot stand still without it, and he will not need to have boards nailed to his stall every day.—COUNTRY GENTLEMAN.

How to make Cheap Beef.

Many farmers are adopting the mode of disposing of their young animals for beef before passing through the second winter, provided they are fine, well grown animals, and in this way they have the growths of two summers and but one winter. The following is the mode adopted by a correspondent of the COUNTRY GENTLEMAN:

My stock for the last three years has consisted of good Durham grades, and I have just killed my first young bullock, aged 20½ months, and fed as follows: For the first three weeks he got the mother's milk pure; for the next four months plenty of good skimmed milk, good clover pasture, and nothing else. At the first approach of winter he was taken up, warmly housed, and fed good hay, and 100 bushels carrots and 12 bushels oats, ground, at 20 cents. This spring he was turned out to good pasture, and got nothing else till Nov. 18th, when he was fit for the butcher; but not wishing to kill him till the weather set in cold, I shut him up to the 11th inst., (Dec.,) and fed him hay and meal, at which date he was slaughtered and weighed, the four quarters, 688 lbs. The meat of a first rate quality, and very fat. I do not state this as being anything wonderful, (though it is here,) but I should like to learn if any of your readers can raise cheaper beef. By this plan of killing early beef, I get rid to a great extent of one great bugbear, the long winter, as I avail myself of two whole summers to one winter, and I find it cheaper to winter calves well, than grown beasts.

Beginning Winter Right.

A correspondent of the CULTIVATOR, alluding to the information he had derived from its pages, makes the following statement in relation to entering winter with animals in good condition:

There is one change which I now regret that I had not made sooner than I have, as I would thus have had fewer deaths among my flock of sheep, more milk from my cows, and my working stock in better condition for spring's work. I had seen it stated on several occasions—probably more than once in every volume—that it was of great importance to have sheep, and other stock, come to the yard or the stables on the approach of winter in good condition, and that it was bad management and poor economy to allow cows, sheep, or any other stock, in fact, to depend wholly on the dry, frozen pastures, as long as snow left them accessible. I had read more than once that it was almost impossible to get an animal that is poor at the beginning of winter, into any better condition while that season lasted. But though all these things seemed reasonable, and worthy of being attended to in practice, like some other of my neighbors, readers too of the same facts and admonitions, I neglected to conform my practice to what my judgment approved. This last autumn, however, I resolved to have my stock in the very best condition before winter should set in, and by feeding cows and sheep a little before they were let out into the fields in the mornings, and a little after coming home at nights, and by other similar arrangements, I managed to have them all fat or in a fair condition when snow came. And though the fear of not having enough hay to carry my whole stock through the winter has made us feed rather scantily, they are all in first rate condition now.

Regularity in Feeding.

Every good farmer knows that any domestic animal is a good clock—that it knows, almost to a minute, when the regular feeding time has arrived. If it has been accustomed to be fed with accuracy at the appointed period, it will not fret until that period arrives; after which it becomes very restless and uneasy till its food comes. If it has been fed irregularly, it will begin to fret when the earliest period arrives. Hence, this fretting may be entirely avoided, by strict punctuality; but it cannot be otherwise. The very moment the animal begins to worry, that moment it begins to lose flesh; but the rate of this loss has never been ascertained—it is certainly worthy of investigation—and can be only determined by trying the two modes, punctuality and irregularity, side by side, under similar circumstances, and with the same amount of food, for some weeks or months together.

There is one precaution to be observed in connection with regular feeding, where some judgment is needed. Animals eat more in sharp or frosty, than in warm and damp weather. Hence, if the same amount by weight is given at every feeding, they will not have enough when the weather is cold, and and will be surfeited when it is warm and damp. Both of these evils must be avoided, while a little attention and observation will enable the farmer to do it.

Profits of Sheep Raising.

J. W. WORCESTER, of Pittsfield, Lorain co., O., gives the following statement, showing how wool-growing pays those who manage it as it should be:—Last season I clipped 250 sheep; the wool sold for $552. I have sold, within the year, 74 sheep, which is equal to the number of all the lambs raised, for $814, making $1,366. My sheep are of the Spanish Merino breed, and mostly ewes; a few bucks and wethers. I have kept sheep the last 20 years, and consider it the most profitable business a farmer can engage in.

A correspondent of the Ohio Farmer says that Messrs. J. & E. W. Bingham, from their farm of 240 acres, (35 of which is woodland, and 40 under the plow,) have sold wool and sheep the past year to the amount of $1,200, and still retain their former number, 350, and these much improved in quality. They have also four horses and ten head of cattle on the farm. The sheep were originally from the Dickinson and Wells stock, but improved of late years by a cross with a pure bred Spanish buck. Sheep husbandry, as carried out on this farm for the last 25 years, has always proved profitable, and adds yearly to the fertility and productiveness of its soil.

Training Draft Animals.

This cannot be commenced too early—at first by acts of kindness, by which they become tractable and confident, and all feeling of fear is dispelled.

Colts and steers should be halter broken and yoked the first winter, and constantly handled, and this practice should never be discontinued. They must not, however, be worked hard while young, for many obvious reasons, but it is important that the training be done thoroughly, in which the art of backing is too much lost sight of. A well trained, orderly pair of cattle or horses, will always command nearly double the price of ordinary animals.

Swine Fed on Skim-Milk.

We published a few years since a statement of the successful feeding and fattening of swine on skim-milk, as practiced by Joseph Greene, of Macedon, N. Y., a mode, however, not entirely new. He fed spring pigs through the summer, and when six or seven months old, they usually averaged about 300 lbs. each. Three, at seven months, weighed in one instance, after being dressed, no less than 956 lbs. in the aggregate. Another animal, at six months and ten days, weighed when dressed 298 pounds. He ascribed his success to feeding undiluted milk, or in its most concentrated state, without any water thrown in. This made them grow rapidly, with solid square bodies, and not like the flabby animals produced when much liquid and little nourishment are given. The fattening was completed on the ground meal of old corn. They did not thrive well on new corn, and failed on "nubbins."

Several others have adopted a similar mode of treatment, with like success. One instance that has recently come to hand, is the following, reported in a late number of the Union Springs Herald:—

"David Anthony killed, on Saturday last, a litter of eight spring pigs, about 8½ months old, and the total weight of which were 2,350 lbs.—an average of 293 lbs. each—the lightest one weighing 280, and the heaviest 320 lbs. We call that hard to beat. If any one can do it, send on the figures."

On inquiring personally of David Anthony as to the mode of feeding adopted, he informs us that these animals are chiefly indebted for their rapid growth to the skim-milk that he gave them, of which he had a plentiful supply. He finished feeding them on 15 bushels of ground Canada corn, which was all the grain he gave them. He intends to plant a few acres of the Canada corn, for fattening his swine another year, as it is fully ripe before the first day of autumn, and is therefore found to be nearly equal to old corn for fall feeding.

Relieving Choked Cattle.

A Portland correspondent of the New England Farmer, gives the following easy and simple remedy:—"The instant a creature becomes choked, no matter what with, the throat becomes dry, and the longer the substance remains, the drier the throat. The following is a sure remedy. Take some oil, no matter what kind, and hold the creature's head up and turn down about one gill of oil, and then let go of the head, and the creature will heave it out in two seconds! I have tried it for years, and never knew it to fail."

Treatment of Sows with Young Pigs.

A correspondent of the Maine Farmer, who has had thirty years successful experience in raising pigs, says:

The hog goes with young sixteen weeks. They seldom vary twenty-four hours from that time. The feed should be gradually increased as much as eight weeks before they bring forth. For two days after, she should have no food except a little thin warm gruel, not to exceed half a pint a day of meal. She should have all the warm water she will take, which will sometimes be two pailfuls in a day. This is very essential, as it helps the flow of milk and prevents fever. You may now gradually increase the feed till the pigs are two weeks old, when she should be full fed. If you have no better feed, good Indian meal, mixed with milk, will answer very well, if you give enough and feed regularly. The pigs should be taught to eat with their mother as young as two weeks, which may be done by having a broad shallow trough, and gently putting them into it when the mother is eating.

Weaning Lambs.

Referring to this subject, W. H. Ladd of Jefferson co., O., (first rate authority on all sheep matters,) says:—My practice is to turn the lambs in with their mothers, after they have been separated some 12 hours, and as soon as they nurse, separate them again; then, after 24 hours, allow them to nurse once more. Since I have adopted this plan, I have never had an ewe's udder injured. Lambs should have a very little salt frequently, when first weaned, as the herbage lacks the large proportion of salt which the mother's milk contains. But great care should be used not to give them much salt at once, or it will set them to purging; and if a lamb commences to purge soon after being taken from the mother, it seldom ever recovers from it.

To Prevent Colts Gnawing Reins.

Wash the reins in alcohol, in which aloes and assafœtida have been dissolved. One trial will usually effect a cure. The same result has been produced when a few seeds of red pepper have been thrust into small incisions in leather, left purposely within their reach.

Cattle Racks.

A western farmer who feeds 150 head of cattle, estimates that the construction of good feeding racks saves him at least 5 tons of hay yearly—more than enough to pay annually for the racks. Judging from the amount of hay we have often seen trodden in the mud, or used as litter by the cattle, as many tons would be yearly saved by some who have not 50 head.

RURAL ECONOMY.

Nails, Nuts, Screws and Bolts.

One of the component parts of a good farmer is mechanical ingenuity. Some lose half a day's valuable time, for want of knowing how to repair a breakage. which an ingenious person could do in five minutes. A team and two or three men are sometimes stopped a whole day, at a critical season, for want of a little mechanical skill.

It is well for every farmer to have at hand the facilities for repairing. In addition to the more common tools, he should keep a supply of nails of different sizes, screws, bolts, and nuts. Common cut-nails are too brittle for repairing implements, or for other similar purposes. Buy only the very best and anneal them, and they will answer all the ordinary purposes of the best wrought nails. To anneal them, all that is necessary is to heat them red hot in a common fire, and cool gradually. Let them cool, for instance, by remaining in the fire while it burns down and goes out. One such nail, well clinched, will be worth half a dozen unannealed.

Nothing is more common than for a farmer to visit the blacksmith shop to get a broken or lost bolt or rivet inserted, and often a single nut on a bolt. This must be paid for, and much time is lost. By providing a supply of bolts, nuts and rivets, much time and trouble may be saved. They may be purchased wholesale at a low rate.

These should all be kept in shallow boxes, with compartments made for the purpose, furnished with a bow-handle for convenience in carrying them. One box, with half a dozen divisions, may be appropriated to nails of different sizes; and another, with as many compartments, to screws, bolts, rivets, &c.

Every farmer should keep on hand a supply of copper wire, and small pieces of sheet copper or copper straps. Copper wire is better than annealed iron wire; it is almost as flexible as twine, and may be bent and twisted as desired; and it will not rust. Copper straps nailed across or around a fracture or split in any wooden article, will strengthen it in a thorough manner.

Farmers' Tools.

A certain number of tools and some skill in their use, will often save the farmer much time in sending for a mechanic, and some expense in paying him. Every farmer should be able to make small repairs on his wagons, gates, buildings, &c. A room, or a portion of a room should be devoted to keeping these tools; a pin or nail should be inserted for each one to hang on, and the name of each tool written or painted under the pin, that it may be promptly returned to its place, and any missing one detected. Keep every tool in its place—do not wait for a more convenient season, but return every one to its pin the moment it is done with. If left out of place a minute, it will be likely to remain a week, and cause a loss of time in looking for it, a hundred times greater than in replacing it promptly. Keeping everything in its place is a habit, costing nothing when formed. The tools should be, a hammer, saw, augers, brace and bits, gimlets, screw driver, wrench, two planes, chisels, mallet, files and rasp, saw-set, trowel. and a box with compartments for different sized nails, screws, nuts, bolts, &c. Common farm implements and tools, such as hoes, spades, shovels, forks, rakes, scythes, &c., may be in the same room, on the opposite side, and the same precautions taken to keep every one in its place.

The Union Washing Machine.

This proves to be a valuable machine in families of moderate size. A full trial proves it capable of washing about twice as fast as the common methods. The work is done by rolling and pressing the clothes at the same time; and the water being kept hot under cover, obviates boiling. We have found the following advantages in this machine:

1. It is neat and compact, and occupies but little room.
2. It confines the hot water under cover, and does not steam the room.
3. It is very easily worked.
4. It obviates soaking and boiling.
5. It does not rub the garments.
6. It saves at least half the labor required by other machines, or pounding barrels, washboards. &c.
7. It is simple in construction, cannot easily get out of order, is strongly made, and will probably last many years without repairs.

Hay and Grain Racks.

A correspondent in Indiana has requested directions for constructing a rack or frame for placing on an ordinary farm wagon, to draw hay and grain upon. There are many modes of construction, variously known and adopted in different localities, and possessing various advantages and defects. Among them we have selected two already well known to many of our readers, but doubtless new to others, and which, on the whole, are perhaps as good as any that are used.

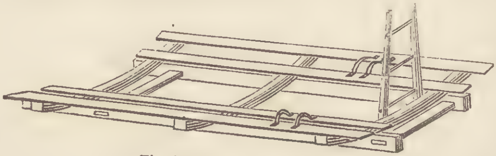


Fig. 1.

Fig. 1 represents a strong frame, the only objection to which is its weight, and the consequent inconvenience of placing and removing it from the wagon. It consists, first, of a bottom frame, (forming the foundation or base,) just wide enough to fit within the stakes of the wagon, made of two side pieces 10 inches wide, 2 inches thick, and about 13 feet long; these are connected at the ends by cross-pieces morticed through them. On this frame rest three curved cross-timbers, about 4 inches square and 6½ or 7 feet long—

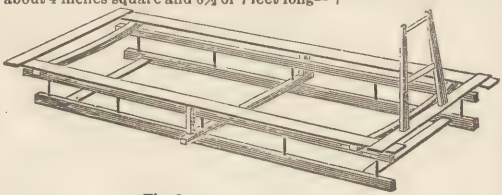


Fig. 2.

the curve may be about 6 inches, or enough for the boards that rest on them to clear the wheels—if the curve is less, the bottom frame must be wider. These timbers support two boards on each side, each board an inch thick and 6 inches wide, and about 13 feet long, or as long as the rack. Stiff, curved iron straps span from one board to the other over the forward wheels, to prevent the hay from resting on the tire. This frame or rack may be modified by making the bottom frame five or six inches wider, and using straight instead of curved cross-timbers, but this will make it heavier, and the load will not rest so securely upon it.

Fig. 2 exhibits a lighter and more perfect frame, but requiring more labor in construction. The eight upright pins or standards, connecting a light foundation frame with a lighter one above, renders the whole so manageable that it may be very easily placed upon or removed from the wagon. The cross-timbers, (consisting of only one at each end,) need not be so much curved—a curvature of three inches is sufficient, and they will be large enough if 2½ by 4 inches; their length may be about 6½ feet, or, if the rack is large, 7 feet. The bottom frame may be made of 3 by 5 inch stuff, 12 feet 6 inches long, and the top frame 2 by 3 stuff. An inch board a foot wide goes all around the top, the extreme length of which is about 14 feet. In both these racks the bottom frame must be made just wide enough to fit within the upright stakes of the wagon, which is usually about 3 feet 2 or 3 inches. The short ladder placed at the forward end, to prevent the load from falling forward, and to fasten the reins to during the operation of loading, should be about four feet high.

Another form of construction is first to make a foundation frame of side pieces about 2 by 8 inches, connected together by four cross-bars morticed into them, nearly as already described, the cross bars being of white oak or other hard wood, into which oblique mortices are cut on each side, within the side pieces. These oblique mortices receive sloping side frames, which complete the rack—the feet of the side frames being thrust into the oblique mortices, and the frame resting against the top of the foundation frame. This rack is not so substantial as the preceding, but as the side frames are taken out and put in separately, one person may more easily place the whole on the wagon.

Preserving Shingles.

Every farmer knows that the cost of the roofs of his buildings, as well as keeping them in repair, is a large item in his expenditures. Experiments should be made to lessen this cost. We observe the following in a late paper:—Dip the shingles in a tub of whitewash made of lime and salt. Line with red chalk. The carpenter may get a little lime on his hands and linen pantaloons, but this difficul-

ty is not a very formidable one. The lime will harden the wood, and prevent its wearing away by rain and weather, and will effectually exclude moss, a common hastener of decay. It is said that shingle roofs will last twice as long when treated in this way, as without it.

Whitewashing each successive layer of shingles after nailing down, is sometimes adopted, but is less effectual. Whitewashing the roof when completed, is comparatively useless, as the lime or but little of it can enter between the shingles, where the water lodges and hastens decay.

Some one may object that this operation is "troublesome," but so is nearly everything that is done in a thorough and consequently economical manner.

Facts for Poor Farmers.

"Those farmers who have most difficulty to make ends meet, always plow most and keep most stock. Now these men take the true plan to keep themselves always poor, because their crops and stock are always poor and bring little." So writes John Johnston, in a letter to the Secretary of our State Society; and he thus illustrates his statement:—"It is good profit to raise 300 bushels wheat from ten acres, but when it takes thirty acres to raise that amount it is raised at a loss. So it is with cattle and sheep. You will see the thinking farmer making four year old steers worth from $60 to $80 each, and his neighbors at the same age not worth over $25 to $40." His advice to the latter is, "if his land is exhausted he should plow no more than he can thoroughly manure. Seed with clover and grass and let it rest, and that field will not only pay well for tillage, but it will furnish manure (if rightly managed) to make another field of the same size rich also." And then keep it rich; do not run it with grain until again exhausted, or "the latter end of that land will be worse than the first."

Time for Cutting Timber.

We have been long satisfied that the best time to cut timber is in summer, provided it is not left in the log, but is immediately worked up into boards, rails, or whatever is intended. It dries rapidly, and becomes hard and sound. Cut and saw basswood in summer, and in a few weeks it will become thoroughly seasoned, and will finally harden so as to almost resemble horn. Cut it in winter, and it will be so long in seasoning as to become partly decayed before the process can be completed. No doubt the presence of the water or sap in great abundance in winter, and especially toward the latter part, hastens this incipient decay. Rails cut and split in summer, and the bark pealed to hasten drying, have lasted twice as long as winter cut rails. A correspondent of the New-England Farmer says he cut and split a chestnut tree early in summer, and "it dried the best and brightest wood he ever cut." It is the practice to cut nearly all timber in the comparative leisure of winter; but there is no doubt that it would be better to pay a higher price to have it done in summer. We would especially invite observation and attention to the subject.

Durability of Posts.

A correspondent of the New-England Farmer reports an experiment on the durability of posts, which we re-arrange and condense. The timber used was "Yellow oak;" it was cut in winter, and each log was large enough to split into two bar-posts, which were set the following spring:

1st Pair.—Butt end down, one charred. Both rotted off the third year; the upper ends were then put in the ground, and they lasted seven years more.

2d Pair.—Butt end down, one salted by boring and plugging. Salted post gave out the second year; the unsalted the fourth year. The ends were then reversed, and each lasted about eight years longer.

3d Pair.—One butt down, the other butt up. The butt rotted off the third year; the other the fourth. The ends were reversed, and the new butt rotted one year before the other, although the latter was set one year the soonest.

4th Pair.—Small ends down, one salted. Both rotted off the fourth year; and being reversed, lasted four years more.

It will be seen that the charring did no good, and salting a green post is useless if not injurious. All the experiments indicate decidedly that posts set reversed last longest; and it appears that seasoned posts last longer than green—the seasoned small ends in the first experiment lasting about twice as long as the green small ends in the fourth.

To Keep Plows Bright.

The moment the plow comes from the field after use—for every good farmer brings his plow in after his job is done, and does not leave it in the field—grease the bright mouldboard and other parts with any kind of cheap grease, which has no salt in it, or with lamp oil. The latter may be best where mice frequent, unless a little arsenic is worked in with the grease, which would soon settle all accounts with these vermin.

Sawing and Thrashing by Horses.

S. E. Todd gives the following statement in the Country Gentleman of his success with an endless chain two-horse power:—I can saw three cords of wood per hour with two horses, with a circular saw; and with a drag saw, with no help but a boy ten years old, I sawed off logs twenty-six inches in diameter in seventy-five seconds per log, including starting and stopping time; drive my grist-mill, clover machine and horse corn-sheller, with which we can shell, clean and deliver in the bag, ready for market, seventy bushels of shelled corn per hour; and by driving business a little, we could do more than this. But this is ordinary work, with an ordinary elevation of the power.

Two years ago I had a good crop of barley, and could not get it half in the barn; and so we would haul a load to the barn, and put the horses on the power, and thrash it about as quickly as we could pitch it up into the mow, and with the same help that was necessary to merely unload it.

For several years past I have raised more or less buckwheat, and by having a horse power and thrasher of my own, I was enabled to get my buckwheat all thrashed before my neighbors had really thought of thrashing theirs. Last fall was a very unfavorable autumn for securing buckwheat; but as soon as the buckwheat appeared at all dry, we could thrash; while my neighbors lost full one-half of their crop before they could possibly get it thrashed. But this is not all. As my buckwheat was secured before it had become water-soaked, it would make much better flour, and millers were willing to pay from four to five cents more per bushel than they would pay for that which had been exposed to storms for several weeks.

My thrasher stands on the second floor of the barn, and the grain falls on the first floor. Therefore, all the help that is needed is a boy to keep away the straw, which a very small boy does with ease, and one to feed, and one to pitch the grain off the wagon. As a general thing, I thrash my grain in the winter, when we have but little to do, and when we can use up the straw economically.

Provide Domestic Conveniences.

Let the wood-house be level with and adjoin the kitchen, and be always supplied with good fuel and dry kindling wood; let the well be provided with the best apparatus for drawing water easily—provide ample cisterns, and connect them, by means of good pumps, with the kitchen—procure the best cook-stove, washing machine, easy churn, butter worker, clothes frames, carpet sweeper—and, if needed, the family sewing machine should not be overlooked. We have known the time when at least one active domestic was required to perform the extra labor of the various operations of building building fires of wet wood, working an awkward churn, washing on a rickety washboard, scrubbing the floor with a worn out broom, tying the clothes line to a peach tree, horse-post, barn corner, and smoke-house, borrowing water at a neighbor's, driving the pigs out of the yard, making sour bread for want of good wood, making rancid butter for want of a good dairy, and deficiencies in smaller domestic appliances.

The Use of Rawhide.

How few persons know the value of rawhide. It seems almost strange to see them sell all of their "deacon" skins for the small sum of thirty or forty cents. Take a strip of well-tanned rawhide an inch wide, and a horse can hardly break it by pulling back—two of them he cannot break any way.

Cut into narrow strips and shave the hair off with a sharp knife, to use for bag-strings; the strings will out-last two sets of bags. Farmers know how perplexing it is to lend bags and have them returned minus strings.

It will out-last hoop-iron (common) in any shape, and is stronger. It is good to wrap around a broken thill—better than iron.

Two sets of rawhide halters will last a man's lifetime—(if he don't live too long.)

In some places the Spaniards use rawhide log-chains to work cattle with, cut into narrow strips and twisted together hawser fashion. It is good to tie in for a broken link in a trace chain. It can be tanned so it will be soft and pliable, like harness leather. Save a cow and "deacon's pelt," and try it.—Country Gentleman.

How to Tan Rawhide.

When the hide is first taken from the animal, spread it flesh side up; then put two parts of salt, two parts of saltpetre and alum combined—(or as much saltpetre and alum as salt)—make it fine; sprinkle it evenly over the surface; roll it up, and let it lay a few days till dissolved. Then take off what flesh remains, and nail the skin to the side of a barn in the sun, or in dry weather stretch on the ground by driving pegs in the edges of the skin. It must be stretched tight, or there will be hard and ugly wrinkles you cannot get out. After drying, and the flesh is sufficiently off, it is fit to cut up. But to make it "soft and pliable like harness leather," put neatsfoot oil on it—fasten it up again, and let it remain a day or two in the sun. Then take a stick about three inches

wide, and long enough to work with both hands, made like a wedge on the end, and rub out all of the oil that can be, and it is tanned with the hair on.

Some persons say a calf skin, (a deacon is better,) tanned in this way, and the hair taken off, and blackened, makes excellent boot leather, warranted not to crack. The only trouble is, it will last too long.

Cow skins are stronger and heavier, and are sometimes only salted and stretched; the flesh taken off, cut into strings, braided into halters or other useful things—the hair shaved off with a sharp knife. To make these strips soft they are oiled, buried in cow manure for a few days, then rubbed and worked till dry.

The skin of a white animnl is not No. 1, nor a red and white, nor a black and white. Avoid spotted skins of any kind. Red is good; black is better.

For an ox whip, cut these strings about one inch wide at the top, and about eight or ten feet long, running to a point. with a buckskin cracker one inch wide, and eight inches long. Hang it to a stick about the length of a walking cane. The stick should be the top of a little pine or cedar. You can crack it so it can be heard as far as you can one of Col. Colt's pistols. It will last as long as the average county insurance companies.—COUNTRY GENTLEMAN.

Sap Pails.

The best kind of pail we have met with is made of tin. These may be kept clean more easily than any other kind, and never impart any sourness to the sap. They may be a little larger at the top, so as to pack away in nests when not in use. Or, they may be made smaller and cheaper, if the sap is gathered frequently—which will be no detriment to its quality. Nine quart pails may be procured for $35 per 100, and six quart for $30. They would soon pay for themselves in the increased value of the fine sugar and molasses afforded by them. The top is wired, like a tin-pan, and a hole under this wire receives the nail on which the pail hangs, thus securing it from swine or other animals, should they happen to stray into the woods; and being hung close to the spout, there is no danger of the wind blowing the dropping sap away. Old horse-shoe nails, straightened and sharpened, are best for this purpose. The best spouts are made of thick tinned iron, and for this mode of securing the vessels, they need not be more than two or three inches long. widest at the end which enters the tree, and made concave by placing the flat strips of metal between a convex and concave piece of wood, and giving them a blow with a mallet.

While boiling, large quantities of sap should not be poured in at a time, as that will stop the boiling and make irregular work; but a reservoir should be placed above the boiler, into which a faucet should be inserted, and the sap allowed to run in a constant stream, which a little practice will enable the operator to regulate to correspond exactly with the evaporation. A stop-cock should also be placed in the boiler to draw off the syrup.

The Cost of Fences.

The Maine State Agricultural Report presents some striking statistics in relation to the cost of fencing. The fences of the State have cost $25,000,000; the repairs require $2,500,000 annually; 6 per cent. interest is $1,500,000; and a renewal in 20 years would be $1,250,000; making the total yearly expense $5,250,000—or two-thirds the original cost of the Erie canal. A strong argument in favor of soiling. Estimated cost of road fences, supposed to be at least one-eighth part of the whole, $3,125,000. The interest and cost of annual repairs and renewing, would be $531,000—the tax paid annually by the farmers of Maine to make the highway a public pasture. To this sum is to be added $150,000, the yearly cost of breaking through snow drifts caused by such fences, and opening roads. These estimates will do to apply to other places besides Maine. The custom now is that every man shall fence out all intruders; the time may come when this will be among the things of the past, as much as that of walling towns to shut out human marauders.

Use of the Clod-Crusher.

SANFORD HOWARD states, in the Boston Cultivator, that the following course is successfully pursued in Scotland with the clod-crusher:—It is of course only used on heavy clay lands, which on plowing break up into large clods, and the land must be comparatively free from stone. The soil having been plowed, and left in large clods, a grubber is passed over the whole, loosening up the clods and leaving them at the surface. The grubber, as our readers may be aware, is like a harrow or cultivator, with long hooked teeth, which loosen the soil as deep or deeper than the plow has run. The clod-crusher is next passed, which breaks the clods into fragments, at the same time it tends to press the soil too compactly together. An indispensable part of the operation is now to follow with a grubber to loosen the crumbled soil.

We have known a corn crop to be nearly doubled in product by the use of a one-horse clod-crusher between the rows, to reduce the lumps into mellow earth. On undrained clay soils, its use would undoubtedly be often eminently advantageous.

USEFUL TABLES.

Value of Food for Domestic Animals.

The figures giving the number of pounds of any one substance to be equal to the quantity given of any other—the results of experiments:

	POUNDS.
Good Hay,	100
Good Clover Hay,	95
Rye Straw,	355
Oat Straw,	220
Potatoes,	195
Carrots,	280
Beets,	346
Ruta Bagas,	262
Wheat,	43
Peas,	44
Beans,	46
Rye,	49
Barley,	51
Indian Corn,	56
Oats,	59
Buckwheat,	64
Oil Cake,	64

Weight of Grain.

Wheat is 60 lbs. to the bushel in all the States except Connecticut, where it is 56 lbs. Rye is 56 lbs. in nearly all the States; Corn 56 in nearly all, but 58 in New-York; Oats 32 lbs.; Barley 48 lbs.; Buckwheat 46 to 50, but mostly 48; Clover Seed mostly 60, but 64 in Ohio and New-Jersey; Timothy 44; Flax Seed 56; Potatoes 60; Beans mostly 60, but 62 in New York, and 56 in Ohio; Blue-grass Seed 14 lbs.; Hemp Seed 44 lbs.; Dried Peaches 28 to 33; Dried apples, 22 to 28.

Consumption of Hay.

The hay consumed by different animals does not vary greatly from three pounds daily for each hundred pounds of the animals. The following table is the result of various experiments, by different persons, and will be useful for farmers who wish to determine by calculation beforehand how their hay will hold out for the winter, 500 cubic feet of Timothy hay, in a full bay, being about one ton:

	POUNDS.
Working horses,	3.08
Working oxen,	2.40
Milch cows, (Boussingault's,)	2.25
Milch cows, (Lincoln's,)	2.40
Young growing cattle,	3.08
Steers,	2.84
Dry cows,	2.42
Pigs, (estimated,)	3.00
Sheep,	3.00
Elephant,	3.12

To Measure Grain in the Granary,

Divide the cubic feet by 56, and multiply by 45, and the result will be struck measure.

To Measure Corn in the Crib,

Multiply the length, breadth, and height together, in feet, to obtain the cubic feet; multiply this product by 4, and strike off the right figure, and the result will be shelled bushels, nearly.

United States Bushel and Gallon.

The United States bushel, adopted now by the State of N. York, is 2150.40 cubic inches.

The gallon, 231 cubic inches.

The dry measure gallon, or one-eighth of the bushel, is 268.8 cubic inches.

Measures of Length.

Gunter's chain, used by surveyors, is 66 feet long, or 4 rods, and each link is 7.92 inches.

The French metre is a ten millionth part of the arc of the meridian, extending from the equator to the pole, and is 39.37079 English inches, or 3.28174 feet. The other French measures, founded upon this, increase or decrease regularly by ten, and are as convenient, therefore, for adding or subtracting as our dollars and cents.

Measures of Weight.

The French gramme is 15.44 grains, and the kilogramme, (1,000 grammes,) is 2 lbs. 3 oz. 5 drams.

Weights of a Cubic Foot,

Of various substances, from which the bulk of a load of one ton may be easily calculated:

	POUNDS.
Cast Iron,	450
Water,	62
White Pine, seasoned, about	30
White Oak, seasoned, about	52
Loose earth, about	95
Common soil, compact, about	124
Clay, about	135
Clay with stones, about	160
Brick, about	125

Bulk of a Ton of Different Substances.

23 cubic feet of sand, 18 cubic feet of earth, or 17 cubic feet of clay, make a ton. 18 cubic feet of gravel or earth, before digging, make 27 cubic feet when dug; or the bulk is increased as three to two.

Capacity of Soils for Water.

The following substances are saturated when they contain, of their own weight:

Sand,	about 24 per cent. of water.
Calcareous Sand,	about 28 per cent. of water.
Loamy soil,	about 38 per cent. of water.
Clay Loam	about 47 per cent. of water.
Peat,	about 80 per cent. of water.

Velocity of Water in Tile Drains.

An acre of land, in a wet time, contains about 1,000 spare hogsheads of water. An underdrain will carry off from a strip of land about 2 rods wide, and one 80 rods long will drain an acre. The following table will show the size of the tile required to drain an acre in two days time, (the longest admissible,) at different rates of descent; or the size for any larger area:

Diameter of Bore.	Rate of Descent.	Velocity of current pr second.	Hogsheads discharged in 24 hrs.
2 inches.	1 foot in 100	22 inches.	400
2 inches.	1 foot in 50	32 inches.	560
2 inches.	1 foot in 20	51 inches.	900
2 inches.	1 foot in 10	73 inches.	1290
3 inches.	1 foot in 100	27 inches.	1170
3 inches.	1 foot in 50	38 inches.	1640
3 inches.	1 foot in 20	67 inches.	3100
3 inches.	1 foot in 10	84 inches.	3600
4 inches.	1 foot in 100	32 inches.	2500
4 inches.	1 foot in 50	45 inches.	3500
4 inches.	1 foot in 20	72 inches.	5600
4 inches.	1 foot in 10	100 inches.	7800

A deduction of one-third to one-half must be made for the roughness of the tile or imperfection in laying. The drains must be of some length to give the water velocity, and these numbers do not, therefore, apply to very short drains.

Contents of Cisterns.

The following gives the contents of circular cisterns, for each foot in depth:

	BARRELS.
5 feet diameter,	4.66
6 feet diameter,	6.71
7 feet diameter,	9.13
8 feet diameter,	11.93
9 feet diameter,	15.10
10 feet diameter,	18.65

Distances for Planting Trees, &c.

	FEET.
Apples, standard,	25 to 33
Apples, dwarf,	5 to 8
Pears, standard,	20
Pears, dwarf,	8 to 10
Peaches, headed back,	12
Cherries, standard,	20
Cherries, dwarf,	8 to 10
Plums, standard,	15
Plums, dwarf,	8 to 10
Quinces,	6 to 8
Grapes,	10 to 12
Gooseberries and Currants,	4
Raspberries,	4
Blackberries,	6 to 8

For the above distances, the following is the number of trees required for an acre:

At 4 feet apart each way	2,720
At 5 feet apart each way,	1,742
At 6 feet apart each way,	1,200
At 8 feet apart each way,	680
At 10 feet apart each way,	430
At 12 feet apart each way,	325
At 15 feet apart each way,	200
At 18 feet apart each way,	135
At 20 feet apart each way,	110
At 25 feet apart each way,	70
At 30 feet apart each way,	50
At 33 feet apart each way	40

Force of Windmills.

The force exerted by windmills will vary greatly with the velocity of the wind. The following table shows the pressure against a fixed surface; from the velocity given in this table, the average velocity of the sails must be deducted, and the remainder will show the real force exerted:

Miles an hour.	Pressure in lbs. on square ft.	Description.
1	.005	Hardly perceptible.
2	.020	Just perceptible.
3	.045	
4	.080	Light breeze.
5	.125	
6	.180	Gentle, pleasant wind.
7	.320	
10	.500	Pleasant, brisk wind.
15	1.125	
20	2.000	Very brisk.
25	3.125	
30	4.500	Strong, high wind.
35	6.125	
40	8.000	Very high.
45	10.125	
50	12.500	Storm or tempest.
60	18.000	Great storm.
80	32.000	Hurricane.
100	50.000	Tornado, tearing up trees and sweeping off buildings.

Quantity of Seed required for an Acre.

Wheat,	1½ to 2 bushels.
Rye,	1½ bushels.
Oats,	3 bushels.
Barley,	2 bushels.
Peas,	2 to 3 bushels.
White Beans,	1½ bushels.
Buckwheat,	½ bushel.
Corn, broadcast for fodder,	4 bushels.
Corn, in drills for fodder,	2 to 3 bushels.
Corn, in hills,	4 to 8 quarts.
Broom Corn,	½ bushel.
Potatoes,	10 to 15 bushels.
Beets,	3 pounds.
Carrots,	2 pounds.
Ruta Baga,	¾ pound.
Millet,	½ bushel.
Clover, White,	4 quarts.
Clover, Red,	8 quarts.
Timothy,	6 quarts.
Orchard Grass,	2 bushels.
Red Top,	1 to 2 pecks.
Kentucky Blue Grass,	2 bushels.
Mixed Lawn Grass,	1 to 2 bushels.
Tobacco,	2 ounces.

Quality of Different Kinds of Wood.

The celebrated experiments of Marcus Bull, of Philadelphia, many years ago, gave the following results, showing the amount required to throw out a given quantity of heat:

Hickory,	4 cords.
White Oak,	4¾ cords.
Hard Maple,	6⅔ cords.
Soft Maple,	7 1-5 cords.
Pitch Pine,	9 1-7 cords.
White Pine,	9 1-5 cords.
Anthracite Coal,	4 tons.

Gestation of Animals.

Kinds of Animals.	Proper age for Reproduction.	Period of the Power of Reproduction.	Number of Females for one Male.	Period of Gestation and Incubation. Shortest Period.	Mean Period.	Longest Period.
		YEARS.		DAYS.	DAYS.	DAYS.
Mare,	4 years.	10 to 12	....	322	347	419
Stallion,	5 years.	12 to 15	20 to 30			
Cow,	3 years.	10	....	240	283	321
Bull,	3 years.	5	30 to 40			
Ewe,	2 years.	6	....	146	154	161
Tup,	2 years.	7	40 to 50			
Sow,	1 year.	6	....	109	115	143
Boar,	1 year.	6	6 to 10			
She-Goat,	2 years.	6	....	150	156	163
He-Goat,	2 years.	5	20 to 40			
She-Ass,	4 years.	10 to 12	....	365	380	391
He-Ass,	5 years.	12 to 15				
She-Buffalo,	....	....	....	281	308	335
Bitch,	2 years.	8 to 9	....	55	60	63
Dog,	2 years.	8 to 9				
She-Cat,	1 year.	5 to 6	....	48	50	56
He-Cat,	1 year.	9 to 10	5 to 6			
Doe-Rabbit,	6 months.	5 to 6	....	20	28	35
Buck-Rabbit,	6 months.	5 to 6	30			
Cock,	6 months.	5 to 6	12 to 15			
Turkey,	....	....	....	24	26	30
Hen,	....	3 to 5	....	19	21	24
Duck,	....	....	....	28	30	32
Goose,	....	....	....	27	30	33
Pigeon,	....	....	....	16	18	20

Quantity of Garden Seeds to Plant.

Asparagus—One ounce produces one thousand plants; requires a seed bed of about 12 feet.

Asparagus Roots—One thousand plants bed 4 feet wide and 225 feet long.

Beans—One quart plants from one hundred to one hundred and fifty feet of row, or one hundred and fifty to two hundred hills.

Beets—One ounce plants one hundred and fifty feet of row.

Broccoli—One ounce gives 2,500 or 3,000 plants; requiring 40 square feet of ground.

Brussels Sprouts—Same as Broccoli.

Cabbage—Early sorts, the same as Broccoli; the later require 60 feet of ground.

Cauliflower—The same as late Cabbage.

Carrot—Three or four pounds to the acre; one ounce to 150 feet of row.

Celery—One ounce gives 7,000 or 8,000 plants; requiring 80 feet of ground.

Cucumber—One ounce for 150 hills.

Cress—One ounce sows bed 16 feet square.

Egg Plant—One ounce gives 2,000 plants.

Endive—One ounce gives 3,500 plants; requiring 80 feet of ground.

Kale—Same as Broccoli.

Leek—One ounce gives 2,000 plants; requiring 60 feet of ground.

Lettuce—One ounce gives 7,000 plants; requiring seed bed of one hundred and twenty feet.

Melon—One ounce for one hundred and twenty hills.

Nasturtions—One ounce sows twenty-five feet of row.

Onion—Four or five pounds to the acre; one ounce of seed sows two hundred feet of row.

Okra—One ounce sows two hundred feet of row.

Parsley—One ounce sows two hundred feet of row.

Parsnip—One ounce sows two hundred and fifty feet of row.

Peppers—One ounce gives 2,500 plants.

Peas—One quart of smaller sorts sows one hundred and twenty feet of row; of larger, two hundred feet of row.

Radish—One ounce to one hundred feet.

Salsify—One ounce to one hundred and fifty feet of row.

Spinage—One ounce to two hundred feet of row.

Squash—One ounce to 75 hills.

Tomato—One ounce gives 2,500 plants; requiring seed bed of 80 feet.

Turnip—One and a half pounds to the acre; one ounce to 2,000 feet.

Watermelon—One ounce to 50 hills.

THE DAIRY.

On Cheese Making.

Mrs. S. JOHNSON, of Schuyler Falls, N. Y., in a letter to the COUNTRY GENTLEMAN, says:

After twenty-five years' experience in the business of the dairy, we having always kept from twenty to twenty-five cows, I think I can give a very good receipt for new beginners.

For ten pails of milk, as soon as milked, while warm, put in the rennet, according to the strength, enough to set it. If it does not set it in fifteen minutes, add a little more. When the curd has set, take a long wooden knife and cut through the curd, both ways, carefully. Let it stand about five minutes, then stir with the hand carefully. Place the strainer over the tub, and dip off the whey Now dip in pans, and set in a cool place over night.

In the morning run up your curd in the same way, and after cutting, put in last night's curd after draining, and squeeze very carefully with the hand, Dip off one pail of whey, and heat scalding hot; if not scalded alike, heat more and stir continually. Then place a ladder over another tub with a strainer and basket, and dip the curd and whey into the strainer. Do not let it settle together. Then remove it back to the tub, and mix one pint of best salt. If sage is wished, three tablespoonfuls is a plenty if dried and sifted. Then put in the hoop, and it is ready for the press. Turn in four or five hours, and let it remain until the next morning; then grease with lard. If the cheese is large, bandage when spread enough. Keep the cheese room dark days, and raise the window nights.

Butter Making.

Our friend HIRAM MILLS, of Lewis county, who has frequently taken Butter prizes at our State Fairs, gives the following as his method, in the Transactions for 1858:

Milk set in tin pans on rack or slat shelves (temperature of room 70 deg.,) and allowed to stand until it is sour, and sometimes until it thickens, but never should be allowed to stand until it turns spotted, as that injures the flavor of the butter. Cream taken from the milk and kept in tin cream-pail until enough is obtained for a churning; use crank churn, propelled by hand: churn from forty to fifty pounds at a time. After the butter has come, draw off the buttermilk and wash with cold water in the churn, unless the butter comes very hard, when the washing is omitted. Butter taken from the churn and worked thoroughly by hand until it is freed from the milk; then apply one ounce Ashton salt to one pound of butter, which should be well worked in, to prevent the butter from being streaked; it is then allowed to stand twenty four hours, after which it is worked with a butter-worker, being careful not to injure the grain. No other substance is used to preserve the butter. Have generally used this kind of salt in making butter; usually pack in eighty-pound tubs, and as soon as one is filled cover with a thin cloth and then a quantity of salt to exclude the air. Tubs are prepared by soaking in brine.

To which may be added, that there is no doubt that every vessel used in the manufacture of the butter, is kept in a state of perfect sweetness and cleanliness, and that no bad odors approach the dairy.

Rules for Cheese Making.

A correspondent of the COUNTRY GENTLEMAN gives the following two rules, which may be useful to young cheese manufacturers:

1st. TO ASCERTAIN HOW MUCH CHEESE YOU OUGHT TO GET FROM YOUR MILK.—Multiply the number of pounds of milk by eleven—point off two figures for decimals, and the product is pounds and decimals of a pound of cheese fresh from the press.

EXAMPLE.--Given, 495 pounds milk—how many pounds of cheese ought it to get? 495 by 11, equal to 54.45 pounds, or 54 45-100 pounds.

This rule applies to the summer. In October you may safely make your cheese a little heavier from the same milk, or perhaps the October milk has a little more cheese in it. The rule is founded on experience. Of course this green cheese must lose a great deal in curing, since both the butter and casein constitute but about eight per cent. of milk.

2d. FOR ASCERTAINING THE QUANTITY OF SALT FOR CHEESE.—Multiply the number of pounds of milk by three—point off three places for decimals. Your answer is in pounds and decimals of a pound.

EXAMPLE.—How much salt for the curd of 495 lbs. of milk? 495 by 3, equal to 1.385, or one pound and 385-1000 of a pound. Now reduce this decimal to ounces, by multiplying by sixteen—point off three decimals as before. Your answer is, 385 by 16, equal to 6 160-1000 ounces, or 1 lb. 6 1-16 oz., is the quantity of salt required for the cheese of 495 pounds milk.

Butter Dairies of Chenango and Delaware Counties.

Chenango and Delaware are among the best butter producing counties in this State; and the following letters, from two of the best butter-makers in those counties, showing how they manage their butter dairies, cannot fail to be read with interest and profit:—

I. FROM JOHN SHATTUCK, OF CHENANGO.

1. In the first place you ask in regard to churning. We use dog power, having the temperature in warm weather about 55 deg. Fahrenheit, which gives the butter a good solid consistency.

2. When the butter comes, it is removed and washed with cold ice-water until the buttermilk is all removed.

3. It is then salted—about one ounce of salt to a pound of butter, worked in thoroughly—and set in a cool place for twenty-four hours, when it is worked just sufficient to remove all the buttermilk.

4. It is then packed in the firkin, and covered tight, so as to exclude the air.

5. When the firkin is filled, then you put a cloth over the butter, put on a good covering of salt, and then pour on water, which makes a brine. We keep it thus covered until it goes to market, (it being the only way we could ever keep a dairy perfectly sweet through the season.)

These rules, strictly observed, I will warrant never to fail, if the butter is properly made.

We use good white oak firkins. Manner of preparing them before putting in the butter—fill them with cold water, to soak three or four days; a handful of salt thrown in will make them all the better. When we get ready to put the butter in the firkin, we rub the inside all over thoroughly with salt, which forms a brine between the firkin and butter.

All the salt used about butter, in any form, should be good dairy salt, as there is more or less lime in other salt, which renders it unfit for butter.

Good soft water is also essential, as hard limy water is very objectionable.

II. FROM S. L. WATTLES, OF DELAWARE.

1. The cows are milked regularly at the same hour morning and evening. The milk is not allowed to stand long in the milk-pails after milking, but is immediately carried to the milk-rooms and strained into tin pans. Only about three quarts are put in a pan, so that the milk may never stand more than two inches deep, often less in very hot weather.

2. The milk-room is above ground, and in the summer time kept as cool as possible and well aired. The milk is left to stand in the pans from thirty to thirty-six hours—never more than thirty-six, and then the cream is taken off.

3. The cream is put in large tin pails with covers, and if the weather is warm the cream pails are set in the cellar to cool the cream.

4. The intention is, always to skim the milk before it gets much sour. Cream rises in pans set as above stated very quickly, and the sooner it is taken off after it has risen the better, both for the quality and quantity of the butter made from it. Cream will all rise, if the milk is very shallow in the pans, even in the hottest weather. And if it is taken off soon enough it will all be saved—while if the milk stands deep in the pans it will sour before much of the cream rises, or if allowed to stand too long before skimming, the cream is wasted and injured in quality.

5. Our women have a way of taking off the cream without the use of the skimmer. They use a knife only. They run the knife around the milk in the pan to separate the cream from the sides of the pan. Then they set the bottom of the milk-pan at the edge, on the rim of the cream pan, then with the left hand elevate one side of the milk-pan so that the cream with the help of the knife in the right hand will run off into the cream pan. After a little practice it is done very quickly and saves both time and cream.

6. The churning is performed every day. The cream taken off one day is churned the next morning. The common crank churn is used, and is worked by dog power. This crank churn is used because it is easiest attached to, and worked by dog power, and because it is more convenient to wash the butter in than the barrel or dash churn. The churning is done very slowly, requiring from two to three hours. The cream having been in the cellar all night, is always cool enough to commence the churning, but if the weather is very hot, and the temperature of the cream is likely to get too high while churning, cold water is put into the churn to keep it down—as very good butter cannot be made when the cream is warmer than 65 deg. when the butter is coming.

7. After the butter has come, the buttermilk is immediately drawn off through a hole in the end of the churn, and then about a half a pail of cold water is thrown into the churn on the butter. The crank of the churn is then turned around a few times and the water drawn off. After that a whole pail of water or more is thrown on the butter in the churn, and the crank again turned quickly a few times, and the water again drawn off, bringing with it every particle of buttermilk. The churn dasher is then taken out, and the remaining water is pressed out of the butter with a ladle.

8. The butter is then taken from the churn and put in the butter bowl and weighed, and it is then salted with one ounce of Ashton salt to a pound of butter. The salt is well worked through the butter with a ladle, and the butter is set in the cellar and stands about twenty-four hours for the salt to dissolve, when it is again carefully worked, and the brine pressed out, and then immediately packed in the firkin.

9. The firkins are prepared for use by filling them with water, and letting them soak eight or ten days. They are then scalded with hot water and rinsed, and after that the inside of the firkin is rubbed with a lump of salt, and it is ready for use, and filled with butter within an inch of the top. A cloth is then put on the butter and covered with salt half an inch deep, and then some brine poured on. The firkin is then covered up with a flat stone. Nothing more is done to them or the butter, except an occasional renewal of the brine when it dries away.

Dairies made in this way have frequently been kept at home, in the cellar, as late as March of the following season, before they were sold, and have stood all the tests of time and different markets and climates.

We pack our butter for family use through the following winter and spring, early in the fall, while the grass is good. It often lasts until the next June, and is always preferred to fresh butter made on hay in the winter, or on hay and grass together, in the spring.

THE APIARY.

Management of Bees.

One of the most successful managers of bees in Western New-York, on a moderate scale, and on the old system, is Curtis Coe, of Cayuga county. He has at present about a hundred and fifty hives, and derives an annual revenue from the sale of the honey, greater than most farmers raise from a hundred acres of good land. He has been in the business many years, and has derived most of his knowledge of bees and their management from his own close observation and experience. He has an additional advantage—in not finding any particular inconvenience in being stung a dozen times or more in a day, should he chance to become mixed up with a pugnacious swarm. A brief notice of his management may be interesting and useful to the inexperienced.

He adopts a simple box-hive, with a door and pane of glass on one side, and vacancies for glass boxes above.

Artificial as well as natural swarming is extensively employed. The present being an unfavorable year, the increase has been only about a dozen of each.

He has employed the movable combs on a plan of his own, but has not adopted it extensively, the crooked combs rendering it inconvenient.

Guide combs being always placed in his hives before the swarm is introduced, so that the combs may be made edgewise against the pane, he is enabled to inspect the operations to some extent at any time.

This arrangement also enables him to secure young queens for artificial swarming, their cells being usually on the outer edges. A puff of smoke sends the bees off of these, when a long-bladed knife, reached up in the slightly raised hive from below, cuts them off, and they drop and are secured. In a few days, if taken at piping time, they come out the perfect queen.

Fig. 1.

The hiving of natural swarms is easily done. A hiving-box, consisting simply of any box holding nearly a half bushel, with one side open, is attached to a pole, as shown in Fig. 1. When the swarm comes out, the operator takes this box by its handle, the box being held over his head, and walks slowly in the midst of the flying swarm. They often alight upon it, and enter its open side. As soon as they begin doing so, it is placed in a fixed position against a fence or tree, or a crowbar hole is made by an attendant, into which the handle is inserted. When the bees have all settled, it is carried to the hive, which is standing in its proper place among the rest, and under which a temporary shelf has been placed, as shown

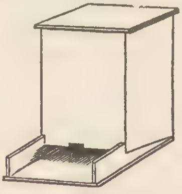


Fig. 2.

in fig. 2, and the bees are emptied by a slight jar upon this shelf. They immediately find

their way into the hive. It is best to empty out two or three successive portions at a time; and if they do not at once find the entrance, a quill sweeps a pint or two within, when their call is sure to attract the rest

This shelf is made so as to raise the front of the hive about an inch or inch and a half high in front, and to keep the other sides closed; it consists simply of a board about twice as large as the bottom of the hive, with

Fig. 3.

a board, cut as shown in Fig. 3, nailed to each side. When the bees have all entered, it is withdrawn. The whole process is usually completed in a few minutes.

When the swarm does not alight in the hiving-box, but on some adjacent tree, the box is held up against the spot, as soon as they begin to cluster, when they leave the tree and pass into the box; or if they do not, a few jars with the side of the box induces them to loosen their hold and enter it. The operation is easily performed, and only a minute or two is occupied in their clustering.

One or two boxes, with long poles for handles, are provided for such swarms as settle too high up for ordinary reach.

The loss of a newly hived swarm, occasioned by their leaving the hive, which occasionally occurs to the owners of bees, has been prevented in this apiary, so that a single loss of the kind has not occurred in twenty years. It consists in simply placing the hive flat on the bottom board for a few days, instead of raising it at the corners the third of an inch, as is always practiced with established swarms.

Four honey boxes are usually placed in each hive, in a chamber, entered by a door, in the upper part.

These boxes are in the form of a cube, measuring about six or six and a half inches on each side. The top and bottom are made of half inch boards; the four sides of glass.

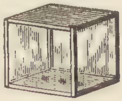


Fig. 4.

The edges of the boards are merely rabbeted to receive the panes, and they are held together by strips of tin on the corners, shielding the edges of the glass, and holding every part in its place. (Fig. 4.) The strips of tin are half an inch wide and seven and a half long; they are folded longitudinally so that the two parts, each a quarter of an inch wide, stand at right angles, and thus form a corner edge of the box, and receive the edges of two panes. They are fastened to the top and

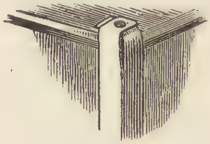


Fig. 5.

bottom board, as shown in Fig. 5, the tin having a short slit in each end, so that one part overlaps the other, and a single tack secures both to the wood. These boxes are quickly made, exhibit the honey handsomely for market, and are manufactured for 18 cents each. They will hold six or eight pounds of honey in comb. As soon as they are filled, which may be determined in a moment by inspection, they are taken out and replaced by empty ones, to be filled in turn.

Three holes, each an inch in diameter, in the bottom board, are bored smoothly with a bit, so as to coincide with three holes in the top board of the hive; and when they are removed, two strips of tin are pushed in under the box, one to shut the bees down into the hive, and the other to secure such as are in the honey box.

One strip is taken away with the box, and the other left on the hive.

The bees are easily driven out, by placing the box on another box of wood of the same size, and open only on the top, of which the honey box forms the tight cover. A slight and frequent jarring motion on the knee drives all the bees down into the dark box, where they soon cluster, and they may be emptied back on the shelf of the hive from which they were taken, or of any other hive not sufficiently supplied with bees. The middle of the day is selected to remove honey boxes, being then least occupied by bees, and especially by drones, which are the most difficult to drive out.

Guide combs are placed so that the combs may be made with the edge to the eye, and a narrow stick of comb is also placed so as to extend down through the middle hole.

The honey being secured as soon as the boxes are full, and while the comb is yet perfectly white, commands the highest price, and has sold in the New-York market at 30 cents a pound at wholesale.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

FARMING MADE PROFITABLE.

THE question is now asked by thousands, "Does farming pay?" It is discussed in newspapers, and at agricultural meetings. And in the minds of many it either remains unsettled, or else the business is pronounced unprofitable. They assert that it is continued hard work year in and year out, with a scanty subsistence at best. Intelligent men have asserted that two per cent is the largest dividend that can be fully relied on from landed property. A hard-working owner of a small farm said, "It requires the hard labor of both me and my hired man through the whole season, to earn enough to pay the wages of the hired man." And it is by no means rare to find men who have received a good farm as a patrimony, that have run in debt and remained so throughout a long life, and left less to their children than they received.

But if farming is a bad business, why is it that three-fourths of our population select it, or remain in it as a matter of choice, while trade and mecha-

nical employments are open to every one? Why do so many voluntarily choose hard labor and misery?

Every business soon finds its level. If any occupation or scheme happens to prove very lucrative, great numbers rush into it, and it is soon overdone. If, on the contrary, it is found a losing business, a portion withdraw, and leave a better field for the rest. And now, after the lapse of thousands of years, we find the great majority of all active men adhering to agriculture as the occupation of their choice. There must be a reason for it. It has indeed been asserted that farmers comprise all the dull intellects, who would be unfit for anything else, and that smart and vigorous men take hold of other kinds of business. Admitting this a moment for the sake of argument, what does it prove? That the most stupid portion of the community, as a body, are more successful in business than the smart and vigorous, for there are less failures among farmers by far, than in what are regarded the most lucrative trades. Amos Lawrence of Boston, kept a record during a long life, of all his mercantile acquaintances, and found that out of every hundred who entered business, ninety-seven failed of success. A similar record, kept in the city of New-York, showed a result but little more favorable. Agriculture, while it does not produce such sudden occasional accumulations of wealth as trade, is not attended with the sudden dissipation of estates that trade often witnesses. A merchant may make a hundred thousand or more in a year; the same business reduces many who are reputed wealthy, to poverty. A thousand young men who engage in the cultivation of the soil, accumulate a larger *aggregate* property, than a thousand who enter trade. If the thousand farmers are the more stupid, they are nevertheless more successful as a body. Then their business must be greatly superior, thus to outstrip their smarter compeers. Either admission, therefore, proves nothing against farming.

It may be laid down as an impregnable position, that no industrious farmer, who has studied his occupation well, and who exercised a medium share of judgment, *ever failed in his business.* If the farmer has fallen behind hand, it has been occasioned by extravagance in some other quarter; or by meddling with speculation; or by office seeking, or some neglect. Many instances are known where men have begun life with little or nothing, and who have accumulated, by farming exclusively, fifty to one hundred thousand dollars, and some even more. A young man in Western New-York, with a few hundred dollars to commence with, owned before he was forty a farm of 700 acres of fertile land, from which he made annually an average of about five thousand dollars. Men who have made twenty or thirty thousand by farming may be counted by thousands; and never, in a single instance, have any of them incurred any danger of becoming bankrupt. During the past season the writer of these remarks visited a number of farmers in one of our counties, none of whom presented their moderate estates, nor their management, as models, but who nevertheless showed that a continued and certain increase

might be depended on, by a good use of very moderate capital. Some of these examples are the following:

ISAAC N. SEXTON, of Venice, Cayuga county, N. Y., occupied 100 acres, which he bought seven years ago at $60 per acre, making the farm cost $6,000. He paid $3,000 at the time of purchase; during the seven years, he has replaced poor fences with durable ones, added farm buildings, and paid the remaining $3,000. Poor health has prevented much bodily labor, but his business has been vigilantly attended to. The annual nett profit, besides supporting a family comfortably, was over $500—which placed continually at interest, with a similar yearly addition, would amount, in a life of forty years, to $100,000.

ALVIN FREEMAN, of Scipio, in the same county, began 35 years ago with $100 as his whole estate. He has now 244 acres of excellent land, all paid for by farming. A young neighbor, FAYETTE VAN LIEW, who had $1,000 five years ago, paid half this amount, or $500, as the first payment towards an eighty acre farm costing $5,200—the remaining $500 was applied to purchase animals and implements. He has paid a yearly average of $640 for the 80 acres in the 5 years, and reduced the debt to $1,800.

GEORGE H. CHASE, of Springport, purchased a 150 acre farm, for $50 per acre, and after occupying three years in learning his new trade, has now, in seven years, tile drained nearly the whole, and made other improvements, all paid for by the products of the land, and has been offered $100 per acre, or double its cost, for its improved value.

HENRY WOOLFORD, of Conquest, same county, has a farm of 123 acres, which he bought five years ago for $6,400, paying towards it $3,000. He has since paid the remaining $3,400 from the farm, besides constructing several hundred rods of good board fence. In other words, he has cleared over $800 yearly, (counting interest,) besides supporting his family.

PETER HODSON, of the town of Venice, occupies 140 acres—of which 100 acres were bought twelve years ago, and 40 since added. At the time of the purchase he had no means—he ran in debt for the whole. From this land, he has paid for all in the 12 years, besides erecting a $1,200 barn, and making 21 miles of underdrain. His farm is worth about $12,000; that is, he has cleared $1,000 annually.

These farmers are better than the average, but there are hundreds of others as successful. Their success consists in a well managed mixed husbandry, with good but not extraordinary crops. Some imperfections were observed in the management of every one; and equally good farming is not difficult for any one who understands the business.

It is not unusual for energetic young farmers to clear $1,000 annually from good 150 acre farms, besides supporting a family. If this course were continued for 40 years, with each yearly sum placed at interest, and interest on interest added, it would amount, at the expiration of this period, to $200,000.

Fig. 2.—Effect of Wintering Animals in Open Fields.

Where is the impossibility, then, of farmers laying up large fortunes if their business is managed with skill?

In order to convince the reader that such a result is not of difficult attainment, let us make a fair and moderate estimate of what may be raised on one hundred acres of improved land, by good management:

15 acres of corn, 50 bushels per acre, 50 cents	$375.00
15 acres of wheat, 20 bushels per acre, $1.25	375.00
15 acres of meadow, 2 tons per acre, $8	240.00
10 acres of oats, 50 bushels per acre, 25 cents	125.00
5 acres of barley, 25 bushels per acre, 50 cents	62.50
25 acres of pasture, worth	200.00
5 acres of good orchard, average $40 per acre	200.00
1 acre of potatoes, 150 bushels, 25 cents	37.50
4 acres of corn, as fodder, 16 tons, worth	80.00
5 acres of peas, 25 bushels per acre, $1	100.00
100 acres.	$1,795.00
Deduct labor, board, wear and tear, &c.	795.00
Nett	$1,000.00

The domestic animals which occupy the farm are not reckoned in the estimate, the pasture and other food they consume being already accounted for. It will be observed that the product per acre is quite moderate—much below what many good farmers obtain, and in but one case exceeding by a fourth the *average* product of these crops, as determined by the accurate county statistics of EZRA CORNELL, of Ithaca, for Tompkins county, N. Y.

Fig. 3.—Appearance of Cattle in Spring, well Wintered under good shelter.

As nearly one-half is required for labor and expenses, an increase of one-half more in the crops, making corn 75 bushels per acre, wheat 30, hay 3 tons, oats 75 bushels, &c., which is attained as an average by the very best cultivators, would make the nett over $1,800. But this increased sum is not needed to show the practicable profits of the business, when it has already been shown that the lesser sum would give the owner $200,000, if continued during an active life of 40 years.

It is admitted that many cultivators of the soil make little or nothing, or what they do make is consumed by waste. One, for example, allows his land to become overrun by weeds. A lessening of the whole crop thus but one dollar per acre, would be $100 each year, amounting in the 40 years, with interest, to $20,000. Another loses as much, yearly, by exposing his domestic animals to winter without shelter, making another $20,000. A like sum is again lost by a want of draining wet fields, and another by raising crop after crop in the same field, without rotation, sinking $40,000. Other points of bad management would run up the sunken fortune to $100,000 or $200,000.

Nothing is more important, therefore, for a successful course, than to ascertain first, what are the most prolific causes of waste and disaster; and secondly, to learn how to avoid them.

Among the prominent causes of disaster, are:

1. Purchasing poor land at a low price, instead of the best at a high one.
2. Want of underdraining in all places where work is retarded, growth lessened, and manure lost, by a surplus of water.
3. Inefficient fences, admitting depredators to destroy crops, and deranging farm order generally.
4. Building poor barns and stables, and allowing them to become dilapidated.
5. Wintering cattle, sheep and colts, at stacks in open fields, presenting the specimen exhibited in fig. 2, (p. 236,) instead of the fine animals shown in fig. 3, (p. 237.)
6. Plowing badly, on the shallow, cut-and-cover system, instead of throwing up the soil into a fine, deep, even, mellow bed of earth.
7. Covering seed imperfectly, in consequence of such bad plowing, and thus allowing weeds and grass a joint occupancy of the land.
8. Planting and sowing too late, thus diminishing the crop to an amount equal to what would be the whole nett profit; that is, throwing away the entire avails.
9. Allowing cornfields to be filled with a dense undergrowth of weeds, and potatoes and turnips with a dense overgrowth of the same.
10. Procuring *cheap* implements, and losing many times the cost of good ones, by the slow and imperfect work they perform.
11. Leaving implements exposed to weather, to crack, warp and decay, scattering them in fields, about the barn-yard, or along the side of the public highway.
12. Throwing brush, rubbish, &c., along fences and highways, thus promoting the growth of mulleins, thistles, burdocks, and nettles; instead of destroying such brush by fire, and leaving neat and clean borders to the fields.
13. Planting the same crop year after year in the same field, thus diminishing the product, and filling the land with weeds.
14. Omitting to spread manure at the right time, and then selling or giving it away to get rid of it.
15. Raising hump-back cattle and landpike hogs, that will consume monthly their entire value in feed, instead of the best animals, which fatten easily on little, and sell quickly for cash at high prices.
16. Feeding animals irregularly, causing them to fret for their food an hour one day, and to receive it before they are ready for it the next.
17. Failure to sow plenty of clover seed, and to plow under annually at least one field as a green crop, for manure, and thus, in conjunction with animal dung, to maintain or increase the fertility and value of the farm.
18. An entire omission to keep accounts of the cost and profits of each field, and of the whole farm, annually.

Avoiding these and other objectionable practices, the farmer who aims at success must remember—first, that *the best land is the cheapest to purchase.* For example, if 25 acres cost $100 per acre, (on account of the intrinsic value of the land,) they will be more valuable than 100 acres at $25 per acre. The 100 acre farm may require $500 to work it, and possibly may yield $500 in the value of all the crops. Nothing is thus made, and the interest is sunk. Good land works more easily than bad, but admitting the 25 acre farm may be worked at the same rate, or for $125, and that the crops are only double the other, or $250, the nett profit would be $125 more than on the 100 acres. If the product of the smaller farm were as much greater in proportion to its cost as the other, or worth $500, then it would nett $375.

Underdraining alone, costing say half the price of the land, frequently doubles, and sometimes quadruples, the product, and costs less to till. It lengthens the season, by admitting earlier working, earlier planting, and a more rapid growth, from the increased warmth of the soil; and, in consequence of the drier bottom, affords better security from frosts.

Rotation of Crops, by retaining fertility, preventing the continued spread of any one weed, and promoting order, is always an important part of successful husbandry.

The Destruction of Weeds is absolutely essential to good farming. Sometimes they consume as much of the strength of the land as the best crops. On some farms, hundreds of dollars worth of products are choked down and crowded out by burdocks, mulleins, chess, red root, Canada thistles, johnswort, rag weed, &c.; and a still greater injury is committed by filling the soil with foul seeds. The good farmer must not allow a thistle in his pasture, a foxtail in his corn, nor a plant of chess in his wheat; but the whole premises should have a neat, chaste, and finished appearance.

Ample and convenient *Farm Buildings*, for the reception and preservation of crops, and for the shelter and comfort of Domestic Animals, are of great importance. Much depends on plan and arrangement. A costly barn may be inconvenient of access, and by bad planning involve much unnecessary labor. A cheaper one, if well arranged, may be made to hold more, and by a proper disposition of parts, save much daily work.

The manufacture and management of *Manure* is absolutely essential for preserving and increasing the fertility of the land. The chief points are, to save all that is made by animals, by absorbents and composting, and to break it fine and intermix well with the soil when applied. Manuring with green crops, and especially by turning under a dense growth of clover, should accompany the practice of enriching with yard manure.

Shelter for Domestic Animals constitutes an important part of successful husbandry. Repeated trials prove that one-third of the food is saved by protection from storms and cold winds, and the animals come out in spring in much finer condition. But wrong opinions on this subject are prevalent. Some have concluded that shelter is of little benefit, because cold winds are

allowed to creep under the sills of the imperfect sheds, and between the wide cracks of the boards. Such cold currents are nearly as bad as full exposure. Others, again, have made close stables, but have neglected cleanliness and ventilation. A clean skin and a pure air are indispensable to comfort and thrift. There are but two ways in which shelter may be profitably given—either by a dry, broad, spacious, tight shed, protected from the sweep of the winds on every side, as for example the basement of a barn well flanked by other buildings; or else by means of stables, dry, clean, well littered, and perfectly ventilated.

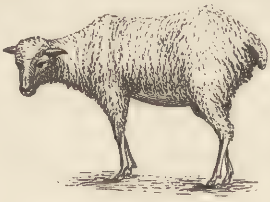


Fig. 4.—Sheep Wintered without shelter.

Improvement of Breeds. A bad animal consumes much food and produces little flesh; is hard to sell, and brings but little in market. The mixture of blood from the best breeds with selected native animals, will often double their value.

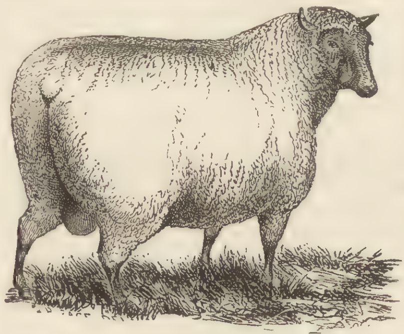


Fig. 5.—Sheep which has been Wintered with shelter.

Measuring Operations and Results. He who weighs and measures can only know with certainty what management is most profitable. A young farmer, who has used a platform scale for two years, for weighing his cattle, and thus determining the best treatment and feeding, asserts that it has already saved him hundreds of dollars. All the fields of a farm should be surveyed or measured, and laid down on a map, by which the product per acre of all crops may be easily ascertained. A great deficiency among farmers generally, is the want of accurate accounts, showing the cost and product of each crop, leaving them to guess at random what parts of their business they should extend, as most remunerative.

Circulating Capital. The man who buys a farm without reserving capital for working it, or for purchasing animals, implements, seeds and manure, and paying for manual labor, is like the merchant who procures a fine vessel and sends it to sea without any cargo, or like the railway company which makes a road but neglects to provide cars and engines. In England, where they are compelled to farm profitably, the circulating capital is required to be about seven or eight times as great as the yearly rent. Josiah Quincy says: "At the great exhibition in Paris, I met an English farmer who told me he had just leased an estate for which he paid eight thousand dollars a

year. I asked him what was the first thing that he did. With a smile he replied, 'The first thing that I did was to invest ten thousand pounds sterling (fifty thousand dollars) in stock, utensils, seeds and manures.'" In this country, the capital thus invested should be about one-half the value of the farm. With a sum much less, it is impossible to conduct the business with profit. For the particulars required, see the article on Farm Management, in second volume, page 130, of "RURAL AFFAIRS."

PERSONAL ATTENTION. A farm is not a self-running machine. It needs constant and vigilant attention. The small farmer may spend a large portion of his time in personal labor; the large farmer cannot, without neglecting a proper supervision. He should, however, understand well how to perform all hand operations, that he may take hold and show awkward laborers where necessary; but his time should be mostly occupied by a constant inspection of all the premises, and rendering, by his presence, facilities for the progress of the work.

In conclusion, the business of the farmer stands pre-eminent for its freedom from all risk, and for the certainty of its profits, if properly managed. It is true, a single crop may be injured or destroyed by insects, or unfavorable weather; but no good farmer depends on a single crop. His profits should come from at least half a dozen different kinds of crops, and from as many different species of domestic animals. If one fails, there are then eleven resources left. As an aggregate result, he is always successful. The poor manager, who works badly tilled, wet, weedy, half fenced land, discovers that failure is the rule, and success the exception; but the energetic, skillful cultivator, who has clean, fertile, well drained fields, rarely meets with a failure, and then only a partial one. His failures, even, are better than the bad farmer's success.

MANUFACTURE OF MAPLE SUGAR.

THE first thing to be done is to clear the woods of logs, brush, and other obstructions to the free passage of a team in collecting sap. A few hours work with an axe and yoke of oxen will open free passages through all the principal parts of the sap-orchard. The place selected for the boiling house should be on the lower side, that the sap may be drawn down hill. If practicable, it should be near a stream of water, as the cleanliness of vessels depends much upon a good supply near at hand.

The boiling house should be comfortable, that the attendant may not suffer in stormy weather. If it covers the fireplace and boilers it should be well lighted, that the presence of any kind of dirt may be quickly seen; and the boilers should be in the centre, to admit of readily passing on either side. There should be a good supply of seasoned wood, to make steam rapidly, as quick evaporation is essential to success. There should be a

reservoir for holding the sap, the bottom of which should be a little higher than the top of the boilers, so that all the sap may be easily run into them, with a faucet. It may be made either a square plank vat, or in the form of a broad hooped tub, and should hold at least a gallon for each tree. To prevent the wood from absorbing the sap, and thus producing sourness, the inside should be well painted. It should be covered, to exclude dirt; and for convenience the cover of a trough or vat should be in sections, opening by hinges.

In large establishments it will be most convenient to have the reservoir a large tub or cistern, placed low down, so as to be easily filled, from which the sap may be pumped or ladled into a smaller feeding trough, placed over the boilers. A partition of thick flannel, set vertically, should be placed near the end of the feeding trough, to strain out leaves, bits of bark, dust, &c., before the sap flows into the boiler

The worst kind of boiler is of cast iron, in the form of a cauldron or kettle. Being rounded, the fire strikes the sides and heats them, and whenever the surface rises in boiling, a portion becomes burnt, and the quality is injured. Much fuel is also required to heat such a boiler. The best are made of sheet iron, and are flat and shallow, so that the fire only reaches the bottom, as they rest at the edges for an inch and a half on the brick or stone walls forming the fireplace. A good form for one is described by a correspondent of the COUNTRY GENTLEMAN. A convenient size is 3 by 6 feet. The following is his description:

Having bought your iron, get it cut the proper size by the tinsmith, or if you have shears large enough to cut it you can do it yourself. Turn over three-quarters of an inch of each inside edge, and lock them closely together with a hammer. Place it on a solid block of wood, and with a punch make a row of holes, half an inch a part, the whole length of the seam. Then put in your rivets, and clinch them tightly. Now with a straight edge mark off 7 inches all around the edge of your iron, then cut it the shape shown in fig. 1.

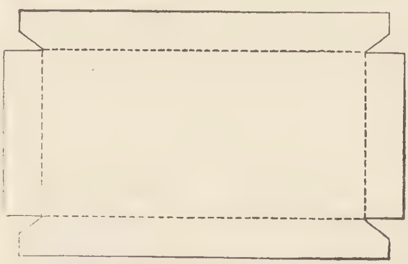


Fig. 1.—Pan for Boiling Sap.

Turn up the ends first, next the sides, which will project beyond the ends; these must be bent over and riveted with two rows of rivets to the ends. Scrape the inside lower corners with a file till they are bright—then apply with a brush a few drops of muriatic acid, diluted with as much zinc as it will dissolve. It can then be soldered the same as tin. The bale should be an iron rod $\frac{1}{3}$ inch in

diameter. Get the blacksmith to bend the corners and weld it. To put it on, cut down each corner one inch and bend the iron round the bale. The last thing is the handles, four in number, which the blacksmith will also make, and you have a finished pan, warranted not to leak, at a cost of say:

30 lbs. iron, at 7 cents	$2.10
Punch	12
Rivets, acid, solder, etc.	25
Iron, for bale and handles, and making same	75
	$3.22

Such a pan as this cannot be bought for less than *nine* dollars, leaving $5.78 to pay for the labor. The acid will be found at every drug store. When the zinc is put with it, it will emit a very offensive odor; therefore it should be set out doors. The whole can be done in a day and a half, which would *pay* well.

Such a pan, he says, will last 12 to 16 years, and be large enough for 200 trees, without much night work. The rivets may be bought at hardware stores for 25 cents per 1,000. It should have ears or handles riveted on at the corners, for convenience in lifting.

Pans may be likewise made as follows, of a single piece of Russia sheet iron, at considerably less expense, but they will be less durable. Make the sides of plank, six inches wide and about two inches thick, about a foot shorter than the sheet iron, so that the latter may turn up at the ends. The wood should be some tough sort, not easily split. The sheet-iron is secured to the plank by double rows of closely driven, broad-headed nails. The fireplace should be a few inches narrower than the pans, and a good draught secured, by means of a chimney of sufficient height.

The same correspondent, already mentioned, describes the following good way for arranging the fireplace and pans:

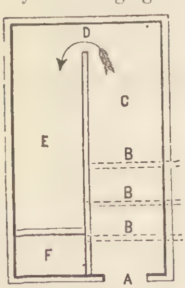


Fig. 2.—Fireplace and Pans.

The annexed cut (fig. 2) illustrates an improved form of arch for boiling sap, which is very highly spoken of by every one who has used it. It is very simple, and any mason of ordinary ingenuity can easily make one.

It consists of a double arch for two sheet iron pans placed side by side. It is made wholly of brick, or can be built on the outside with flat stones.

A is door for wood—B B B three hollow cast iron tubes to lay the wood upon, extending through the wall at the right hand side. By having them cast hollow, the heat passes out into the open air, making them much more durable. They are three inches in diameter, and placed about six inches from the floor of the arch—C pan—D flue for passage of the fire—E pan—F chimney, or a wide stove pipe will

answer as well. The space under pan E need not be more than 12 inches deep, as no wood is placed under it. It should be raised about four inches higher, so that the sap, after it becomes heated, can be carried into the other pan by a syphon rigged with a faucet, so that the flow can be regulated.

The pan C can be made longer than the other, but should not come quite out to the end of the arch, as the sap would be burned on the pan. A better way is to have the pans of the same size, so that they can be changed at the end of each boiling season, as the pan over the hottest fire will burn out much the soonest.

The operation of boiling sap in one of these arches, rigged as I have described it, is as follows:—In the morning fill both pans, and then build the fire. The sap in the pan C will be boiling before that in the other; when it is, put your syphon in its place and guage it so that it will just keep the pan C full; then start the cold sap from the holder, (also fixed with a faucet,) so as to keep the pan E full also.

This looks very well on paper, *but equally as well when in operation in the sugar bush.* The *advantage* of this kind of arch is economy of fuel. In the common straight arch a great deal of the heat passes up the chimney, the bricks of which are always so hot as to be unbearable to the naked hand, and when boiling in the night I have often seen the flames *rising a foot above the top of the chimney.*

In the improved kind there is no such waste of heat, and it has been accurately ascertained that the quantity of wood that will boil sap for 100 pounds of sugar in the old, will boil enough for 135 to 140 pounds in the new fashioned arch. A saving of from 35 to 40 per cent in the quantity of fuel, and the cost of preparing it, is worthy the attention of every one that makes maple sugar.

Fig. 3.—Cook's Evaporator.

A convenient mode is to have a long, horizontal fireplace, the pan for the fresh sap being placed first or in front, and a few inches higher than the other pan, which is nearest the chimney, so that the heated and partly evaporated sap may run from the front to the rear pan through a simple tube, the stream being regulated by a faucet.

A little practice will enable the operator to regulate the faucet so that the sap will run a stream into the boiler as fast as the evaporation carries it off. The sheet of flame, after passing the fireplace, should be in a thin stra-

tum, not over two or three inches thick, and this space should be left next the bottom of the boiler. A flame filling a space a foot thick, if spread out to four times its breadth, and only three inches thick, would evaporate nearly four times as rapidly. There should be a damper placed in the flue, so as to control completely the heat, as the contents of the boilers approach the nature of syrup, and such a damper is absolutely essential in "sugaring off."

Cook's Patent Evaporator, (fig. 3,) is an excellent contrivance for boiling down sap, which is admitted at one end, and is gradually thickened by evaporation as it passes to the other end, the rockers on which it stands affording the means of regulating the process.

Neal's Evaporator is newly invented, and is highly spoken of. It possesses a great advantage in its control of the fire, by means of dampers, the rods for working which are shown in fig. 4. The sap is represented as flowing in at one end, and the syrup discharging at the other.

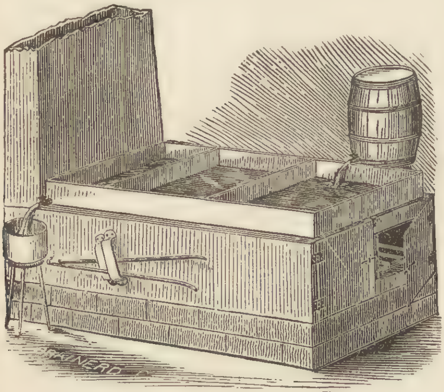


Fig. 4.—Neal's Sugar Evaporator.

Both Cook's and Neal's Evaporators were made with a special view to the manufacture of Sorghum syrup, but they are also well adapted to its manufacture from the maple.

The sap pails may be made of wood or sheet tin. Wood is the cheapest, tin the best. If made of wood, they should be smallest at top, to prevent the hoops from falling off, and the better to exclude dust. Good ones, well painted inside, have been offered at $15 per 100. If tin is used, they should be made largest at top, so as to pack away in nests when out of use, and thus prevent bruising. The top should be stoutly wired, with a hole under the wire, to hang on the nail or hook, hereafter described. Manufactured of the best tin, they will cost about $30 per 100, if holding nine quarts; or $25 if holding six. Tin vessels are easily kept clean, and if so, never impart sourness. Well painted wood vessels are nearly as good; but unpainted ones easily become soured.

There are two ways of making the spouts, of tinned sheet iron, and of wood. When the former are used, the vessels must be hung up against the tree just beneath the spout, on a nail driven into the tree. Old horse-shoe nails, straightened and sharpened, are good for this purpose. Tin vessels

have a hole just below the wire rim, already described, for hanging on the nail; wooden vessels must have a wire loop. These being hung closely under the spout, the latter need not be more than three inches long. They should be widest where they enter the tree, and be concave so as to follow the incision of the gouge. They are easily made by cutting the tinned iron to a proper size, and then giving the concave form by placing them between a convex and concave piece of wood, and striking the two together with a smart blow of a mallet. Ground sharp at the wide end, they are easily driven into the tree. Half an inch into the sap wood is quite deep enough. Many prefer the gouge to the auger, as they think it disfigures the tree less, no other cut being made than that of the gouge; and when the tree begins to become dry, a second cut is as good as the first. The work is done in less time than with an auger.

The best wood spouts are made as shown in fig. 5. Thick inch-board will answer for the material. They should be about four inches long, and shaved just large enough at one end to fit the auger hole in the tree. A hole is bored lengthwise through them, for the passage of the sap. In order to have all the right size, bore a hole in a board, and whittle each down till it will exactly fit it. The size should not exceed seven-eighths of an inch, nor the hole be bored more than three-fourths of an inch into the tree. The Hook for the pail, fig. 6, is made of very stout wire; when the hole is bored into the tree, the loop of the hook is placed against it, and the spout driven through the loop. A hole bored in the side of the wooden vessel near the top, receives the hook, which should not be bent up so much as the figure indicates. The slight shoulder of the spout holds it against the tree, where it has no purchase, and a heavy weight will not draw it out. Both are easily removed as soon as the sugar season is over, and the necessity of withdrawing nails is obviated.

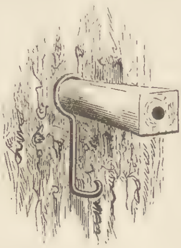


Fig. 5. Spout and Hook for Sap Pail.

Fig. 6. Hook.

Fig. 7.—Pail on the Hook.

Both these kinds of spouts are good, and their advantages are nearly equally balanced. One or the other should be adopted, and the pail hung up against the tree, (as shown in fig. 7,) to prevent leaves being blown into it, to obviate the necessity of blocking up the vessel, as when set on the ground, or settling out of place as the snow melts, to avoid the loss occasioned by the wind blowing the dropping sap out at the side, and to be safe from the accidental visits of swine.

Before commencing operations, the first and most important requisite for

the success of the whole process, must be kept constantly in view, namely, *perfect cleanliness.*

If possible, never allow the sap to stand in the vessels twenty-four hours. The fresher it is boiled the purer will be the sugar. If the sap sours in wooden vessels at any time, they must be scalded again before using.

When the sap is collected by means of horses and sled, simple open barrels or high tubs answer every purpose; if a circular board, an inch or two less in diameter than the inside of the barrel, float on the sap, it will entirely prevent it from splashing out.

In districts of the country where there is much deep snow in the woods, it is sometimes easiest to collect sap in a cask placed on a hand sled, with runners five inches wide, made of thin boards, shaved thinner where bent. These are somewhat flexible, and on this account run over the snow with a load more easily. The collector should have snow shoes, if necessary.

Some good manufacturers use lime water to neutralize the minute portion of acid that exists in the fresh sap from the tree. This portion varies; but it is believed that one quart of lime water to a barrel of sap is enough. Where brass or copper vessels are used for boiling, the lime water is indispensable in preventing a slight action on the metal, and dangerous consequences. It should be applied to the sap in the reservoir, before it is run into the boilers.

Sap varies in saccharine strength. Trees growing in open fields, or in exposed places, furnish a richer sap than those in a dense forest. Usually, it needs reducing to about one twentieth of its bulk, to form a good syrup. When this is accomplished, strain it through flannel into a clean barrel, and let it stand 12 to 24 hours. Then draw it off carefully, through a faucet, leaving the sediment. To save all the sugar in this sediment, more sap is then applied, to dilute the syrup, which in a few hours is drawn off to be returned to the boilers.

The next process is to convert the syrup to sugar. This may be done in one of the pans, but many prefer a separate brass kettle. In either case, the fire should be controled easily, either by a damper in the flue or by hanging the kettle on a crane. When placed in the pan or kettle, to every gallon of syrup add a beaten egg and a gill of milk to clarify it, keeping it hot but carefully from boiling till the scum has risen and been skimmed off. If eggs cannot be readily obtained, then milk alone may be used. If it boils, the scum is broken and mixed again with the syrup. In an hour or two most of the impurities will have risen and been removed by a constant use of the skimmer, the fire having been allowed to slacken. Some manufacturers of excellent sugar think the eggs and milk unnecessary, and even detrimental, provided every precaution is taken to keep the sap clean. The scum, which contains much sugar, should be saved, the sugar dissolved in sap, and the latter drawn off, as in the case of the sediment, already mentioned. Before the final heating is applied, a purer sugar would be made by

again straining through flannel. The remainder of the boiling should be carefully but rapidly performed. The precise point of time when it will best granulate, is determined in various ways. When the bubbles rising to the surface burst with a slight or just perceptible explosion, from the tenacity of the thickening liquid; or if a drop hot from the kettle into an inch of water forms a distinct solid globule slightly flattened when it strikes the bottom; or if a drop between the thumb and finger will draw out into a fine thread half an inch long—the process has gone far enough. Another mode—that of blowing out a ribbon—is sometimes practiced, and is thus described by a correspondent of the COUNTRY GENTLEMAN:—Take a short twig, limber it by dipping its end into the boiling sugar, and then form a loop with a hole half an inch in diameter. Dip this loop into the sugar and bring it up quickly, and blow through the loop-hole. When it will go off in a ribbon eight or ten feet long, it is done. It will ribbon a few feet before it is done; but wait a few minutes and try again, till it will perform according to order. This process is something like blowing soap bubbles. It is then poured into vessels to granulate.

The same correspondent thinks it important to add a piece of butter the size of a butternut to a batch of 50 pounds. If there is any tendency to boil over, add a little more butter.

The practice of carrying the syrup to the house, for sugaring off, should not be adopted. It is laborious to carry it, and when there cannot be constantly watched for several hours, to prevent boiling over or burning, which no housekeeper can do and attend to her other duties at the same time. If a proper boiling-house has been erected in the woods, it will afford every facility for the entire process. A neat shanty, made of rough boards, 18 by 24 feet, may be erected for $25, or less.

To obtain dry sugar, place it in a tub, barrel, or hopper shaped box, with holes for draining off the molasses. To make white sugar, lay a few thicknesses of flannel on the top of the sugar while draining, these flannels to be wet and washed daily with cold water—they will thus absorb and wash out the coloring matter.

A hundred good sugar maple trees will usually make, in a season, from two to three hundred pounds of sugar, when well managed. If every precaution is observed to insure cleanliness, prevent souring, boil speedily and without burning, and to clarify properly. a larger quantity of sugar will be made, and it will be more saleable, and command a higher price; and if intended for home use, the smiles of the farmer's kind wife, when she sees such a beautiful article make its appearance, will more than repay him for all the pains he has taken to secure success.

A correspondent of the COUNTRY GENTLEMAN states that "the Maple Sugar crop of the State of Vermont, for 1857, was estimated at 8,300 tons, or nearly half the maple sugar crop of the United States, as given in the Census for 1850, and about one-eighteenth of the sugar crop of the Union."

THE BEST WAY TO BUILD A HOUSE.

THE first rule which a person should adopt who is about to build, is, ***not to build in a hurry.*** His plan must be well perfected; and when this is done, he may let the job on more favorable terms by not being compelled to make purchases to a disadvantage, and by allowing the mechanics to do much of the work during the comparatively leisure time of winter; besides which, time is required to season the stuff thoroughly, and to allow newly erected walls to settle, before finishing the rooms. Secondly, he should let the job only to a skillful and reliable builder, and not attempt to beat him down below a fair price, but pay for what the work is worth. For, by making a hard bargain for the builder, he is bribing him to furnish poor material and slight his work. Thirdly, never let the job, nor commence building, until the design is not only well digested, but plans, elevations, and complete working drawings made by a competent architect. The fifty or hundred dollars required to procure these will usually be saved several times over before the completion of the job. An acquaintance, who had given much attention to planning houses, and who had read books on rural architecture, concluded he could superintend the erection of his own new dwelling, and need not pay a professional man for plans and specifications. But not having the exact dimensions of every part, his carpenters wasted much lumber in cutting; and many alterations had to be made. He said afterwards that he had lost at least three hundred dollars in trying to save fifty, yet his knowledge of building exceeded that of most who engage in it. This is but the history of many others.

The several designs which have been given in the former numbers of the REGISTER, will furnish many valuable suggestions to any one about to erect a dwelling; but they can never obviate the necessity of the above mentioned requisites for a dwelling of any pretensions.

In order that such persons may know what is required in a specification, the following form is furnished, including most of the requisites for letting the job, and by its aid an intelligent carpenter or builder may make an estimate of the smaller and cheaper kinds of houses, where the labors of a competent architect cannot be had; but even then, finished, measured drawings are indispensable, or the alterations and "*extras*" will far exceed the cost of the best digested plan, by a first class architect.* For, whenever any work is let by the job, it is very essential that nothing be omitted, in order that no alteration nor addition may be made while the work is in progress.

It will of course be obvious that much variation will be required in adapting this example to any particular building; some portions will be omitted, and many things added, as circumstances require.

*** The usual price for plans, elevations, sections, working drawings, and full specifications, with an estimate, is about two per cent on the whole estimated cost.**

SPECIFICATIONS.

(FOR DIMENSIONS, SEE WORKING AND OTHER DRAWINGS.)

CARPENTER'S SPECIFICATION.

Stories.—Cellar 8 feet, first story 9 feet, second story 14 feet at peak, furred down level, making it 8 feet: all in the clear.

Timber.—Posts and sills each 4 by 8 inches; inter... and braces each 3 by 9 inches; trimmers and trimmer beams or joists, 4 by 9 inches, each 20 inches from centres; hip and valley rafters 4 by 8, all other rafters 3 by 6 inches, 3 feet from centres; braces 4 by 6 inches; studs 3 by 4 inches, 24 inches from centres; all sound and seasoned [specify the kind] timber; each tier of beams or joists cross-bridged. Exterior walls to be filled in with burnt brick; and furred off with plank 16 inches from centres; first and second floors prepared for deafening.

Partitions.—All of 3 by 4 inch plank, 16 inches from centres; door and window posts 4 by 6 inches.

Windows.—Sash all 1¾ inches thick—for other sizes and dimensions, see drawings.

Roof.—Boarded with best hemlock inch roof boards, with one inch joint, covered with best shaved pine shingles, half an inch thick at the butts, and 5 inches to the weather.

Cornice or eaves, as shown in drawings, [or formed on brackets sawed out of four inch stuff;] 4 inch tin leaders; gutters, valleys, and around chimneys, lined with sheet lead.

Siding.—Three-quarter inch clear narrow white pine, rabbeted to show half an inch on the lower edge; put on in courses and well nailed.

Floors.—First story laid with clear 1¼ inch white pine, well seasoned; second story, with good quality 1¼ inch white pine; all tongued and grooved and well nailed.

Base.—A neat plank base, with moulding, for all the rooms and closets, and surbase for the kitchen.

Doors.—Entrance door 1¾ inch thick, with side lights; other doors 1⅝ inches thick; all hung with butts, and fastened with mortise locks with porcelain knobs and escutcheons; doors in second story 1½ inch thick and fastened with 6 inch rimlocks with mineral knobs. Woodhouse doors battened and hung with large wrought hinges, with centre bar and large hook and staple inside.

Door and Window Trimmings.—In first story, to be with 6 inch bead casings and band moulding; in second story with 5 inch bead casings and band mouldings; first story windows trimmed to the floor with panels; green Venetian blinds to each window, well hung and fastened. Inside panel shutters to bay windows, well hung and fastened.

Stairs.—Steps 1¼ inch, risers 1 inch, with coves, all clear white pine; with a round 3 inch rail, 1½ inch turned balusters; newel 6 inches, [all best mahogany, black walnut, &c.,] well varnished.

Closets.—Fully shelved, with clothes pins, and ventilators.

Veranda.—As shown in the drawings; strongly timbered; floor laid of narrow 1¼ inch white pine; rafters planed; roof tongued and grooved plank, planed on the lower side.

Mantels.—Neat pilaster mantels, with bases, caps, and bed-moulding under the shelf; shelf 1½ inch plank.

Balcony.—Locust timber 5 inches square, well secured to wall; moulded timber rail, brackets and rail, as shown in drawings.

Painting.—All the work usually painted, and also the floor, ceiling and rafters of the veranda, to be painted with two coats of white lead in oil; the exterior a light brown stone color.

Glazing.—The glass throughout to be first quality American cylinder, all well selected.

The materials, to be all of best quality specified; the lumber and timber well seasoned, and the work to be done in a neat, substantial, workmanlike manner.

MASON'S SPECIFICATION.

Digging.—Cellar dug and earth smoothly and properly leveled about the building.

Foundation Walls.—Base course 2 feet 6 inches wide, of large flat stones, the top of base 8 inches below cellar floor; rest of the walls 18 inches thick, the portion above ground outside laid in courses and pointed; foundation for veranda, porch columns, and for chimneys; outer stone stairs; all built of good hard stone, laid in best lime and sharp sand mortar.

Brick Work.—Cellar partitions 8 inches thick up to first story floor; chimneys as in plan; chimney shafts of hard smooth brick; all in best lime mortar.

Cellar Windows.—Caps and sills of dressed stone; ¾ inch round iron bars 4 inches from centres, well secured, set in window frames.

Plastering.—First and second story to be lathed and plastered, the first story with

three coats, the last to be hard finish; the second story and kitchen two coats; all with best Rhode Island lime and sharp sand, and put on in the best manner.

Cistern.—Built of stone, laid in and plastered with three coats of best Rosendale cement with sharp sand, according to plan, six feet high and covered with planed 2 inch pine plank.

Materials, throughout, to be of the best quality specified, and done in a neat, substantial, workmanlike manner.

ILLUSTRATED GLOSSARY OF ARCHITECTURAL TERMS.

The man who is about to build, should know enough of Architecture to understand fully the technical terms used in specifications, that he may see that the work is executed according to contract. To assist in this object, the following Illustrated Glossary is given.* Many terms, now nearly obsolete, are omitted; while others are retained that may not occur in ordinary building, but which are frequently found in books on Rural Architecture.

GRECIAN DORIC.

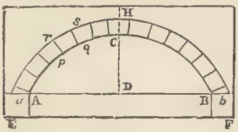
ROMAN DORIC.

CORINTHIAN.

Abacus, the upper portion or member of the capital of a column, on which the architrave is laid.

Abutment, the mass of masonry, earth or timber, at the end of a bridge, or the solid part of a pier supporting an arch.

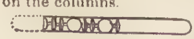
Arcade, a covered walk along the side of a building, with columns on the outer edge, supporting arches. Against dwellings they usually occupy a recessed portion, or are inclosed on three sides, and are therefore more secluded and afford more shelter than the piazza or veranda, which are usually open on two or three sides.



ARCH.

Arch, a curved self sustaining structure, supported at the ends. C, the *keystone;* A E, B F, *abutments;* the beginning of the arch is called the *spring* of the arch; the middle, the *crown;* the distance A B, the *span;* and C D, the *height*.

Architrave, the lower of the three members of the entablature, resting immediately on the columns.



ASTRAGAL.

Astragal, a small moulding, with a semi circular profile, placed as an ornament on the top or bottom of a column.

Attic, the upper story or garret of a building. An *attic base*, is the base of a column, with the double mouldings as shown in the figure.

ATTIC BASE.

Balcony, a projection from the exterior wall of a building, inclosed with a railing, usually placed before a window or glass door in the second story, and supported by brackets, and sometimes by columns.

Baluster, one of the upright portions of a railing, often miscalled *banister*.

Balustrade, a range of balusters, connected by a rail on the top, and commonly called a railing.

Barge-board, the projecting board placed at the gable, so as to hide the horizontal timbers of the roof; more properly called *verge-board*.

Batten, a narrow strip of board, commonly used for covering the exterior joints of vertically boarded buildings. A *batten door* is made simply of boards, with battens nailed on across them to serve as stiffeners.

BATTLEMENT.

Battlement, a wall on the top of a building, formerly military, now used as ornament.

Bay, generally, the space between posts or buttresses; in farm buildings, a low space for storing hay, the word *mow* being applied to lofts for the same purpose, or spaces not extending down to the ground.

Bay Window, a window, curved or angular, set in an exterior projection from the walls of the house, and having its base on the ground. An *oriel* window is similar, but is not supported on a foundation connected with the ground, and is commonly smaller.

BEAD.

Bead, a moulding whose vertical section is semi-circular; or a moulding ornamented like beads, as in the figure.

* For a large portion of the figures, and a few of the definitions, we are indebted to Worcester's excellent and complete Quarto Dictionary, and to the liberality of his publishers in furnishing the cuts. All the rest is prepared originally and expressly for the Register.

Bearing, the span of a beam or rafter, or that part which is without support.

ENGLISH BOND.

FLEMISH BOND.

Bond, mode of laying bricks or stones, to break the joints. When the *stretchers* and *headers*, as they are called, are in alternate and separate courses, it is termed *English bond;* when alternately in the same course, *Flemish bond.*

Bond-timber, timber laid in a wall horizontally, for tying it together.

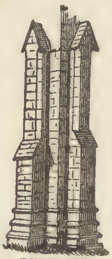
Boudoir, private ladies' room, for calls, dressing room, &c.

Box-shutters, shutters folding into cases.

Bracket, a support for shelves, stairs, balconies, but now more commonly for projecting roofs.

Breast of a Chimney, the contracting part of the back, opposite the throat.

Brick-trimmer, a brick arch, abutting on the wooden trimmer, under the slab of a fire-place, to prevent the communication of fire.



BUTTRESS.

Bridge-board, the notched board on which the steps of wooden stairs are fastened.

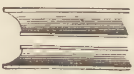
Buttress, a prop or support of masonry against the sides of a building, to resist pressure and stiffen walls.

Camber, convexity or arch on the upper side of a beam.

Campanile, a tower on a building, serving as a belfry.

Capital, the upper, projecting, and ornamental part of a column.

Casement, applied to windows divided into two parts by the mullion, and hung on hinges.



CAVETTO.

Cavetto, a concave moulding, whose profile is the quarter of a circle.

Cess-pool, a well or cistern under the mouth of a drain, to receive the sediment which might otherwise choke it.

CLUSTERED COLUMN

Clustered Column, one made of several united.

Cobble-stone, a round stone, often used for walls of buildings by imbedding in regular courses in mortar or cement.

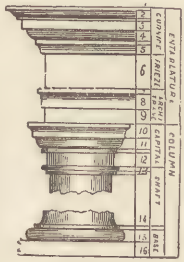
Colonnade, a range of columns.

Column, a pillar consisting of base, shaft or body, and capital. The figure shows the different parts, both of the column and entablature.

Composite Order, a compound of the Ionic and Corinthian Orders.

Console, a bracket.

Coping, the capping stone or brick covering of a wall, wider than the wall itself, to throw off the water.



COLUMN.

COMPOSITE ORDER.

CORINTHIAN ORDER.

Corbel, a projecting piece of wood or stone from a building.

Corinthian Order, an order of Grecian Architecture, as shown in the figure.

Cornice, the upper projecting division of an entablature; and more generally, any moulded projection which crowns or finishes the part to which it is attached.

Corridor, a gallery or passage.

Cottage ornee, an ornamental cottage, usually intended as a picturesque residence, and where expression or appearance is a chief object.

Course, a continuous horizontal range of stones or brick in a wall.

Cove, the concavity of an arch or ceiling.

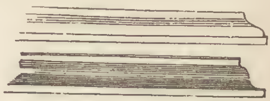
Cross-bridged, the cross-bracing placed between a series of timbers or joists.

CURB ROOF.

Cupola, a spheroidal roof or dome, but more commonly a small structure on the top of a dome.

Curb-roof, sometimes *mansard* roof, but more commonly in the United States, *gambrel* roof, a roof with the lower half inclined at a steeper angle.

Cyma, a wave-form member or part of a cornice; also termed *ogee*.



CYMA.

Deafening, a floor covered with mortar placed beneath a common floor, to exclude sound, and prevent the passage of flames.

DORIC.

Details, applied to the drawings of the separate parts of a building, usually termed *working drawings*.

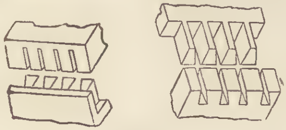
Doric, an order of Grecian Architecture, inter-

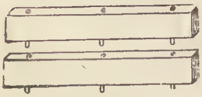

DORMER WINDOW.

mediate between the Tuscan and Ionic, distinguished for its simplicity, strength and chasteness.

Dormer window, a window standing vertically on a sloping roof.

Dove-tail, a joint made for connecting wood, the parts cut in the form of a dove's tail expanded, with a corresponding hollow.


DOVE-TAIL.


DOWEL.

Dowel, a pin used in connecting two pieces of wood, as shown in the cut.

Dressings, parts to decorate plainer work, as the mouldings of a window are its *dressings*.

Drip-stone, a projecting window-cap, usually hollowed beneath that the rain may drop from it.

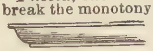
Dumb-waiter, a cupboard or platform running on pulleys, to convey dishes, food, &c., from one story to another.

Elevation, a drawing of the face or principal side of a building, as if every part were seen exactly in front, and differing from a perspective view, which is seen from one point.

Entablature, the whole of the parts of an Order, above the column, including the architrave, frieze and cornice. See fig. *Column*.

Facade, the front of a building.

Fascia, one of the parallel bands used to break the monotony of an architrave.


FILLET.

Fillet, a narrow, flat band, used for the separation of one moulding from another; the upper and lower bands in the annexed figure are fillets.


FINIALS.

Finial, in Gothic architecture, the top or finishing of a pinnacle or gable.

Flashing, lead or other metal let into the joints of a wall, so as to lap over gutters, and prevent the rain from injuring the interior works.

Float, a long straight edged board used to render a plastered wall perfectly straight.


FOILS.

Foils, a term applied to all those rounded or leaf-like forms seen in Gothic windows, niches, &c.

Footing, the spreading courses at the base of a wall.

Frieze, the middle part of an entablature, between the architrave and cornice. See figure under *Column*.

Funnel, the stack or upper part of a chimney, the shaft.

Furring, slips of wood nailed to joists and rafters, to bring them to an even surface for lathing.

Gable, the triangulur end of a house above the eaves.

Gain, the beveling shoulder of a joist or other timber.

Gallery, a common passage to several rooms in an upper story; a long apartment for paintings, &c.

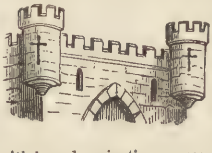
Gambrel roof, see Curb-roof.

Gingerbread-work, a useless profusion of fanciful ornamental carvings.

Girder, the principal beam or timber in a floor.

Girth, horizontal connecting timber in an upright frame.

Gothic Architecture, the style of architecture denoted by the pointed arch. It admits of great variation in all its parts; for example, the roof may be castellated, as in the opposite figure; or pointed, as in the *Tudor* sub-style; or, with broad projecting eaves, as in the Cottage Gothic. A still greater variety exists in the windows, among which are the arched, triple lancet, rose, square headed, oriel, triangular, and other forms.



Grained, painted in imitation of the grain or texture of certain kinds of wood.

Groin, a line made by the intersection of two arches, crossing each other at any angle.

Ground-sill or *ground-plate*, the lower and outer timber, supporting the posts.

Hall, a large public room; the first large room within a building; but in a more common and restricted, and perhaps improper sense, the narrow entrance of a dwelling house, which is better designated *entrance hall*.

Hammer-beam, a horizontal timber, in place of a tie beam, just above the foot of a rafter; used in pairs to strengthen Gothic frames.

Harmony, in large buildings, where variety prevails, is some one feeling that pervades the whole, and brings all the varied parts into an agreeable relation to each other.
Downing.


HIP-KNOB.

Headers, bricks laid crosswise in a wall, in contradistinction from stretchers, laid lengthwise. See *Bond*.

Hip, the sloping angle of a hipped roof.

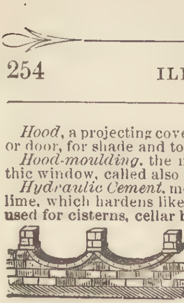
Hip-knob, a finial, pinnacle, or other ornament, on the point of a gable, or on the hips of a roof. See *Pendent*.

Hipped-roof, a roof with sloping ends.

Hood, a projecting covering over a window or door, for shade and to throw off water.

Hood-moulding, the moulding over a Gothic window, called also *label moulding*.

Hydraulic Cement, mortar made of water lime, which hardens like stone under water, used for cisterns, cellar bottoms, &c.


INVERTED ARCH.

Intertie, a horizontal piece of timber between two posts, to keep them together.

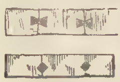
Inverted Arch, arch curving downwards, to give a firm foundation to piers.


IONIC ORDER.

Ionic Order, a Grecian Order of Architecture, as resresented in the annexed cut.

Italian Architecture, an irregular and beautiful style of modern architecture, possessing many of the characteristics of the Roman, and a variety nearly equal to that of the Gothic. It has projecting eaves, arcades, balconies, ornamental chimney tops, campaniles, &c.

Jack timbers, those shorter than the rest in the same row or line, by being intercepted by something else.


JOGGLES.

Joggles, pieces of hard stone introduced to stiffen the joints of masonry.

Joint, the place where two pieces of timber come together.

Joist, the smaller timber of a floor.

Key, a piece of wood let into another, across the grain, to prevent warping.

King-post, the middle post of a framed roof, reaching from the centre of the tie-beam to the ridge; sometimes called *crown-post*.

Label, the outer moulding over a window or doorway, descending a short distance on each side.

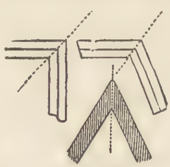
Lancet-window, a window in Gothic architecture, acutely pointed at the top.

Landing, the floor at the head of a flight of stairs, or portion of a flight.

Lintel, the head piece of a door or window frame.

Lodge, a small house or tenement connected with a larger. A *gate lodge* or *porter's lodge*, is one placed near an entrance gate to an estate, for the inmates to attend the gate.


LOUVER WINDOW.

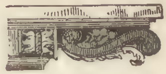

MITRE.

Louver window, a window open to the sound of bells within, but with blinds to exclude rain.

Mansard roof, see curb-roof.

Mitre, the junction of two boards, at an angle, by a diagonal fitting. The dotted lines in the figures are the mitre-lines.

Modillion, a carved horizontal bracket.


MODILLION.


MORTISE AND TENON.

Mortise, a hole cut in a timber, to receive a *tenon*, or corresponding piece of another timber

Mouldings, the ornamental contour given to angles of cornices, window jambs, &c., or to ornamental lines or borders generally.

Mullion, the upright post or bar, dividing the two or more parts of a window.

Newel, the column about which the steps of a spiral staircase wind.

Notch-board, the board which receives the ends of the steps of a flight of stairs.

Ogee, see Cyma.

Oriel window, a projecting window, supported on a corbel or other projection. It differs from a bay window, in the latter being always with a foundation resting on the ground.

Ovolo, a convex moulding, whose profile forms about a quarter of a circle on its lower inclined side.

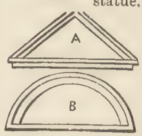
Panel, a sunken space, most commonly applied to the portion of a door, between the upright pieces called *styles*, and the horizontal pieces called *rails*.

Parlor, the sitting room or living room of a family, or for the common intercourse of the family; but at present more commonly restricted to a room for visitors.

Pavilion, a word variously applied, but more commonly at present in rural architecture, to a broad, highly finished veranda, on the better class of dwellings.


PEDESTAL.

Pedestal, the lower part or base of a column, consisting of the *die* or square trunk, the *cornice* or head, and the *base* or foot; also, the support of a vase, statue, &c.



PEDIMENT.

Pediment, the triangular or circular part of a portico, between the roof and top of the entablature. The flat portion, (A or B,) is termed the *tympanum*.

Pendent, an ornament hanging from the vault of a roof, in Gothic architecture; but more commonly from the peak of a gable—the lower part of the ornament being the pendent, and the portion above the roof the *hip-knob* or *finial*, both of which see.


PENDENT.

Piazza, usually, a covered walk on one or more sides of a building, supported on one side by pillars. It is used nearly synonymously with *veranda*, although the latter properly implies more shade and seclusion, a veranda often having lattice work in front.

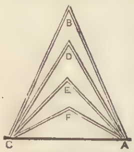
Pier, usually the pillar-like masses of masonry from which arches spring.

PINNACLE.

Pillar, a general name for a permanent prop or support; a *column* is an ornamental pillar, usually round, and belonging to one of the Orders of Architecture.

Pinnacle, the summit or apex; usually a square or polygonal pillar, at the angles of Gothic buildings, terminating at a point, and embellished with ornament.

Pise, a wall constructed of stiff earth or clay, rammed in between moulds as the work is carried up. In countries where frequent rains prevail, it cannot be very durable, unless covered, and is similar in character to walls of unburnt brick.



PITCH OF ROOF.

Pitch of a Roof, the proportion between the height and the span. If the rafters exceed in length the width of the building, the roof has a "knife edge pitch," as A B C; if equal to the width, it is Gothic, as A D C; if two-thirds, as A E C, it is termed a Roman or "true pitch;" while A F C is the Grecian pitch. More commonly the pitch is designated by numbers; for instance, if the height of the ridge is one-fourth of the span of the roof, it is termed "quarter pitch;" if one-third the span, "third pitch," &c.

Plan, a drawing of the horizontal section of a building, showing the distribution, form and size, of the parts.

Plate, see *Roof*.

Plinth, a projecting, vertical faced member, forming the lowest part of the base of a column or wall.

Pointing, trimming with mortar the joints of a wall of masonry.

Porch, an exterior appendage to a building, forming a covered approach to a door or entrance.

Porte cochere, a carriage porch, or covered entrance to a large dwelling, under which a carriage may drive.

Portico, a covered space or projection, surrounded by columns, at the entrance of a building. A porch is a covered station, and a portico is a covered walk.

Purlins, horizontal pieces of timber to support rafters.

Putlog, a horizontal timber to support a scaffold.

Quarters, upright posts in partitions, to which lath are nailed.

Rabbet, a cut made on the side or edge of a board, to receive, by lapping, the edge of another cut in the same manner.

Rail, a horizontal piece of timber, as between the panels of a door, over balusters, &c.

Rebate, a groove sunk in the edge of a board; a rabbet.

Reeding, a small convex moulding.

Ribbing, the timber work sustaining a vaulted ceiling.

Ridge-pole, or *ridge-plate*, the horizontal timber or board sustaining the upper ends of the rafters.

Romanesque, an impure style of architecture, adopted during the later period of the Roman Empire. It is prominently marked by arches and columns, and irregular forms.

Roof, the upper covering of a building, consisting mainly of two parts, viz: the

OGEE ROOF.

FRENCH ROOF.

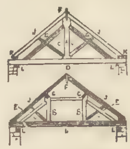
framing or trussing, and the covering of shingles, slate, tile, tin, lead, &c. The dif-

GABLE ROOF.

HIP ROOF.

ferent forms are shown by the accompanying figures, showing a curved or French roof, a

CURB ROOF.



ROOF TIMBERS.

roof with an ogee curve, a gable, hip, and gambrel or curb roof. The two annexed figures exhibit the different timbers of the roof:—A, king-post; B B, queen posts; C C C, braces; D D, tie-beams; E E, principal rafters; F F, ridge piece; G G, purlins, seen endwise; J J, common rafters; K K, pole plates; L L, wall plates.

Room, interior division of a dwelling, entered by a door. The first room, (in houses containing all these different apartments, is the *vestibule*, or *looby*, or *ante-room*, when used as a reception room. The second, the *hall*, or first large room within the building: but oftener the term hall, or more properly *entrance hall*, is applied to the smaller apartment in common dwellings, combining the purposes of both hall and vestibule in larger ones. There are the *library*, *study*, or *office*, or a room with these variously combined; the *parlor* or *family room*, sometimes used as an every day living room, and in other instances as a breakfast room, or a room for company only; the *drawing room*, or room specially for the reception of company, or into which the company retire from the dining-table. In the smaller houses the parlor and drawing room are one. The dining room and kitchen are distinct; and appended to the kitchen may be the laundry or wash room, the store room or pantry, for provisions; the iron closet, for the coarser utensils; the *scullery* or sink room, where utensils and dishes are cleaned and kept; the *bath room*, which may also be a wash room; the *nursery*, or room for small children, which may be also used as a bedroom, or have a bedroom opening to it; *boudoir*, or ladies' private dressing room, or for the private reception of company; and bedrooms, the larger of which should have dressing rooms attached, and all should have

closets. In the largest and most expensive dwellings, all these rooms are found separately; but as dwellings become smaller, the purposes of two or more are combined in one.

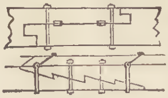
Rough-cast, a rough mortar or cement for the exterior walls of buildings, mixed with pebbles, small shells, &c.

Rubble, small rough stones, used for walls or filling between walls.

Rustic work, building with the faces of stone left rough, and the joining sides wrought smooth; ornamental wood structures, with the bark on.

Safety-arch, an arch built solid in the substance of a wall, to sustain any unusual weight on that part; a discharging arch.

Saloon, a lofty, spacious apartment; a state room; a reception room.



SCARF-JOINTS.

Scarf-joint, a joint made by cutting away corresponding portions of timbers.

Shaft, the principal or central part of a column; the chimney above the roof.

Shoe, the projecting part of a water pipe at bottom, to throw the water from the building.

Siding, the exterior side covering of boards to a building.

Sill, the lower, horizontal timber of a frame, door or window.

Specification, an exact written description of the different parts of a building to be erected.

Springer, the base of an arch; the rib of a groined roof.

Stack, a number of chimney shafts combined in one.

Stile, the vertical piece in framing or paneling.

Strut, an oblique timber in a frame, serving as a brace. The term brace is usually applied to smaller and shorter pieces.

Stucco, a fine plaster for covering walls, and for interior decorations. It is sometimes made of pulverised marble and plaster of Paris; but the best is made of two parts of sharp and perfectly pure sand, and one part of the best and purest lime, the latter slacked with water to a fine powder, sifted and mixed with the sand. Very few kinds of water-lime will do for outside walls, as it is apt to crack off after becoming moist and freezing, and no water-lime should ever be used for this purpose that has not stood ten years successful trial. Outer walls, stuccoed, should have broad projecting eaves to throw off water.

Stud, a piece of timber inserted in a sill to support a beam—a term usually applied to the upright scantling of a frame.

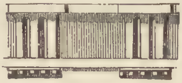
Surbase, a cornice or series of mouldings above the pedestal; also applied to the board which passes horizontally around the walls of a room, to protect them from the backs of chairs, &c.

Terra cotta, baked clay; architectural decorations, vases, chimney tops, &c., made of a mixture of pure clay and broken flints, crushed pottery, and other materials, and burned to the hardness of stone

Tie, timber serving to bind walls or other parts together.

Tracery, in Gothic architecture, the ornamental, feathery, or foliated upper parts of an arched window, formed by the branching of the mullions; the intersecting rib-work on a vaulted ceiling, &c.

Trap, a small water reservoir in a drain pipe, to intercept bad odors, and retain sediment.



TRIGLYPHS.

Triglyph, an ornament repeated at equal intervals in a Doric frieze, as shown in the cut.

Truncated gable, a gable with a portion of its roof drooping in front.

Truss, a horizontal timber supported by bracings above, so as to form a long span without posts below.

Turret, a small tower, usually attached to and forming part of another tower.

TUSCAN ORDER.

Tuscan, the simplest Order of Architecture, formed in Italy in the fifteenth century.

Valley, the receding angle formed by the meeting of two inclined sides of a roof.

Venetian blind, a window blind made of slats of wood strung together so as to be raised or lowered by a string.

Venetian door, a door having panes of glass on each side for lighting the entrance hall.

Venetian window, one formed of three apertures, separated by slender piers, the centre one being the largest.

Veranda, a covered walk on the side of a building, of an awning-like character, with slender pillars, and frequently partly enclosed with lattice work. It is usually understood to be more secluded than a piazza. An *arbor veranda* is where the roof is merely a frame covered with foliage.

Verge board, the gable ornament of wood work—often called *barge board*.

Vestibule, see *Room*.

Villa, a country house for a wealthy person.

Volute, a scroll or spiral ornament, which forms the principal distinction of the Ionic capital, and is also found in the Corinthian and Composite. See *Ionic Order*.

Wall plate, see *Roof*.

Water-closet, a privy, supplied with a a stream of water, or water pipe, to keep it clean.

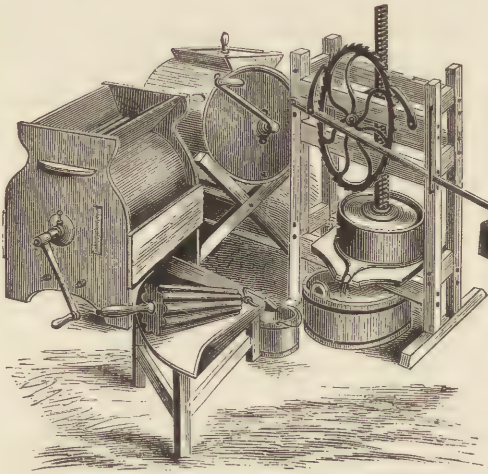
Weather-board, a board on the gable from the ridge to the eaves; the outer boards of a building nailed so as to overlap and throw off rain.

Weather-moulding, a moulding or dripstone, over a door or window, to throw off rain.

Well-hole, the space enclosed by the walls of a circular stair-case.

Working-drawings, drawings of different parts of a building, according to accurate measurement, including plans, elevations, profiles, and sections, by which the builders are to be guided.

Wainscot, the wooden lining on the interior surface of a wall.



THE DAIRY.

HINTS ON BUTTER-MAKING.

Depth of Milk.—Col. Pratt, of Prattsville, Greene county, formerly the celebrated tanner, now equally successful with the Dairy, finds that the largest quantity of cream rises, and consequently the greatest quantity of butter is made, when the milk is *one and a quarter inches* in depth in hot weather—and an inch and a half deep in cool weather—seven or eight quart pans thus containing but two and a half quarts for the first named depth, and three quarts for the latter. The temperature is kept, as nearly as possible, to 62°, although in warm weather it may run up to 65°, and in extreme cases to 70°.

New way of Making Butter.—J. Zoller, of Oswegatchie, N. Y., saves the labor of setting his milk in pans, skimming, and taking care of the cream, by simply straining the milk of one day into six churns, and churning next morning, by horse power, the milk being then sour, but not loppered. He thinks he also makes more butter in this way, from the same quantity of milk. The milk being sour, produces butter more readily than if fresh. An experiment, carefully made, with cream from pans, and by the above method, resulted in giving 10 per cent more butter from the churned milk.

Churning.—Cream from fresh cows should be in such a condition and at such a temperature that the butter will come in 30 minutes. In autumn, it will require an hour. If the butter comes quickly, it is not so good, nor in

full quantity. If churned too long, it is injured. The temperature of the cream should be 62° to 65°, regulated by a thermometer. Guessing will not do. Do not pour hot or cold water into the cream to temper it; but if there is no thermometer churn to be had, put the cream in a tin pail and set it in warm or cold water, as the case may require; or set a tin pail, with hot or cold water, into the cream. Cold is most readily imparted by the latter mode, and heat by the former, because cold descends, and heat rises. Butter is delayed in coming, in cold weather, by four causes, namely: keeping the milk so cold that the cream does not sour; mixing sour and sweet cream; mixing cream from old and new cows; and too low a temperature for the cream. Sometimes the granules of butter will not "gather"—in which case a lump of butter thrown into the churn will form a nucleus, around which the butter will soon collect in masses. [The left figure at the head of this article represents the thermometer churn; the middle upper one, KENDALL'S, described on p. 216, vol. 1, of RURAL AFFAIRS.]

WORKING BUTTER.—Every one knows that to make good butter, and that will keep well, all the buttermilk must be worked out. It should be worked first, when freshly taken from the churn; then salted with the purest salt, one ounce to a pound of butter; then allowed to stand 15 to 20 hours; then worked till the brine runs from it clear, and then packed. In working, the butter should be cut and pressed, but not rubbed or spread, which injures the grain or texture. Good butter is made both by washing, and by not washing—but as a general rule, cold water is beneficial when the butter has come soft and light colored. [The lower figure at the head of this article represents one of the best and simplest butter-workers, the rolling of the grooved cylinder or cone pressing the butter in its alternate movement.]

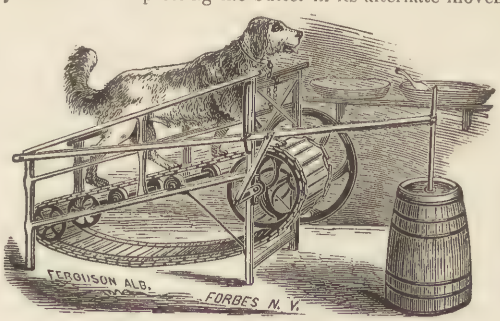


Fig. 2.—EMERY'S DOG OR SHEEP POWER CHURN.

CHURNS, AND WORKING THEM.—The best churn is the thermometer churn, because it gives complete control of the temperature. But the old churn with vertical dasher, being the simplest, has advantages over all others; and by care in examining the cream with a thermometer, and tempering by

the means already described, it does well. It should never be worked by hand—this is too laborious, and time is too valuable. Horse power is good for large dairies, or where the milk is churned; water power is apt to fail in the dry part of summer, when most needed, and it is expensive to keep the machinery always in repair. It is expensive keeping a large dog for churning, and such an animal is often a great nuisance. H. Olmstead, of Delaware county, N. Y., a skillful dairyman, prefers a *large sheep*, (large coarse-wool breed,) and states that it will churn three times a day without inconvenience—will churn the butter for 20 cows—costs much less to keep than a dog—and secured with a light chain fifteen feet long, so that its place for feeding may be changed once a day, it is always ready. When done with in autumn, it is turned with the rest of the flock, and requires no further care till spring. One such animal was used for a 15-cow dairy till 18 years old; another until 17 years old; and a third, now 13 years old, churns from 2,000 to 3,000 lbs. of butter yearly. Both endless chain and circular wheel power may be used.

Washing Butter.—A correspondent of the Boston Cultivator says he has not had rancid butter in the spring for thirty years. He washes it. Not with water, which he, with most good butter-makers, regards as injurious, but with *sweet* skim-milk, salting it afterwards. Have any of our readers tried this way, and with what results? There are some good butter-makers that wash their butter with water, and make a better article than some bad manufacturers who do not wash it. But equal skill, cleanliness, and careful management, would doubtless with these good manufacturers make better butter without washing.

RULES FOR MAKING CHEESE.

[The acknowledgments of the writer are due to X. A. Willard of Little Falls, for much valuable information on this subject, communicated for this article, but he is not responsible for all its statements.]

RENNET.

1. Select a healthy calf for rennet, four or five days old, (four weeks old will do,) kept without food twelve hours before slaughtering, for the secretions of the stomach to accumulate in strength.

2. Empty, but not rinse the stomach, sprinkle it with salt, in three days thoroughly rub with salt, and stretch on a hoop and dry at a moderate heat. Use it when a year or more old.

3. Steep the rennet in a stone jar, a gallon to a rennet, stir often with salt and rub it, always keep more salt than will dissolve, to insure saturation. In three days to a week, the liquid is fit for use, and may be kept bottled in a cool place. Avoid all taint—a fruitful source of bad cheese. One gill will do for 35 gallons of milk; or a pint for 25 pounds of cheese—some-

times, when best, a pint will do for 50 pounds. Stir it before using a portion.

TOOLS AND VESSELS.

1. Provide a graduated scale for the tub or vat, so as to measure the quantity of milk readily at any time, by mere inspection. This scale may be made by measuring the vat and calculating its contents; or by pouring in successively a gallon at a time, and marking the height of the surface.

2. *Keep all vessels perfectly and scrupulously clean*—and prevent all odors from passing near the cheese house.

3. The improved cheese vats give more perfect command of the whole operation, are easier to use, and make more cheese, than the old or common tubs or vats. They consist, essentially, of an oblong tin trough, placed in a larger wooden vat, with a space two inches all around, covered with the projecting rim of the tin trough. The two inch space is filled with water, gradually heated, and examined by a thermometer.

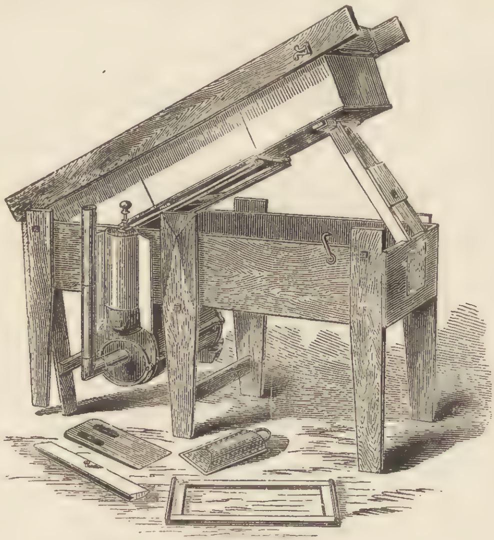


Fig. 3.—Roe's Western Reserve Vat.

There are several excellent patent vats—two of which are here figured and briefly described.

Roe's Western Reserve vat.—This has been extensively used. The cut shows the back side of the vat when opened, after using; the tube on the end of the heater, which is beneath the vat, is for the escape of steam.

Oneida Cheese Vat, Ralph's Patent.—The cut shows distinctly the interior and construction, (fig. 4.)

The prices of these vats vary from $30 to $50, according to size.

4. The tools are a dipper, a curd-cutter of a gang of steel plates or two-edged knives, a broom for sweeping up curd, a thermometer, a graduated rule for measuring the milk, already described, a furnace for heating the stratum of water, a press, cloth, and a set of hoops.

Fig. 4.—Oneida Cheese Vat.

Fig. 5. Fig. 6.

Curd Cutter.—The annexed cuts represent Young's Curd Cutter, the five blades seen edgewise, (fig. 5,) and also the form of blade, (fig. 6.) These blades are thin, two-edged, and each sixteen inches long and seven-eighths wide, and are set one-fourth to one-half an inch apart. A gang of this size is very convenient for handling, although some have more.

Thermometer.—A common thermometer will answer the purpose, if the case be open at the bottom, to facilitate cleaning, and to admit freer contact with milk. It should be accurate, (many are not,) and be graduated above the boiling point, so that hot water may be used for washing it.

Fig. 7.—Dipper.

Dipper.—When the whey is drawn off through the bottom of the vat, there is not much use for a whey dipper. A two quart dipper with a short handle, (as in fig. 7,) is most convenient for transferring the curd.

Cheese Cloth.—Thin cloth manufactured for the purpose, and known in market as "cheese bandage," is used for encasing the cheese. It may be colored the desired shade in the piece, so that the cheese may be of a uniform color. Annatto, dissolved in weak ley, is employed for the purpose. To use it, take a strip of cloth long enough to go round the cheese, two or three inches wider than the thickness of the cheese. Sew the ends together and whip the edges with small cotton twine. When completed it should be just large enough to slip over the cheese, and by drawing up the twine to come over the edges of the cheese, top and bottom, say an inch or an inch and a half, according to the size of the cheese.

HOOPS.—X. A. WILLARD says: "I am inclined to think that the best hoops, for pressing cheese, are made from galvanized sheet iron, turned over stout wire at top and bottom. Hoops in common use here are made of iron banded pine staves, painted on the outside. Bent hoops of elm or hickory are also used. A dairy of 30 cows will need hoops of four sizes, an inch difference in diameters—say 17, 18, 19, 20, and perhaps 21 inches in diameter."

PROCESS.

1. Strain the evening's milk directly into the tub; in warm weather cool it down, so as not to sour in the night, either by placing tin coolers with ice, in the milk, or by running cold water in the space surrounding the vat. It may be kept too cold—it should be about 65° or 70°, although cheese makers differ as to the exact temperature. "Many contend that the nearer the milk approximates to souring, without becoming actually sour, during the process of its manufacture into cheese, the larger the quantity and better the quality of the cheese. I believe it is universally conceded among the best dairymen, that by the too free use of ice or cold water about the milk, the evening's milk may be kept too sweet."*

2. When the evening's and morning's milk are both ready, place them in the vat well mixed together, and gradually raise the temperature to 88 or 90 degrees, (lower in hot weather and higher in cool,) and add, and mix thoroughly, enough rennet to curdle the whole in 40 minutes, which will be about one gill to 30 or 40 gallons. Cover it with a cloth and let it rest an hour. Colder milk will make imperfect and soft curd, and porous cheese. Good curd has a firm consistence, and on raising a portion with the fingers, slits readily apart, or leaves a vacuum behind the finger when passed through it.

3. Cut the whole mass into perpendicular columns with the cutter; let it stand ten minutes, cut it smaller, until about the size of wheat kernels; in a few minutes, if the whey has formed rapidly, dip off a part and apply gentle heat; work the whole mass slowly with the cutter, that all may be alike affected, till in about an hour the heat reaches 100° by the thermometer—let it remain at this temperature one to one and a half hours. Do not use the hands for working the curd; and if, when slightly squeezed in the hand, it is elastic and falls to pieces on opening the hand, the heating has been long enough. Too much or too little is injurious. The whey is now passed rapidly off, through the tin strainer in the corner of the vat, the opposite end being raised to facilitate its flow, and the curd pressed by the hands. Draw the curd back from the strainer, and lift the other end higher, to complete the drainage. When cooled to about 88 degrees, apply salt, ground fine, at the rate of one pound to 40 of cheese, if the cheese is to be used in a month or two; or one pound to 25 or 30, if to remain the whole season. Some apply a less quantity. Rich curd needs more salt than poor.

* X. A. Willard.

4. Place the curd in the hoop while yet warm, (if too warm the cheese will be strong,) and put the whole in press. In a few hours turn and apply fresh cloth, and press till next morning. Let the pressure be moderate at first, and increase it gradually for two days, turning it twice in twenty-four hours, and substituting dry cloths. Some good cheese makers think 24 hours long enough for the cheese to remain under pressure. When taken from the press to the curing room, oil it with hot whey butter, and let it be thereafter turned, rubbed and greased, once in twenty-four hours. The whey butter is made from the cream of the whey by simmering over a slow fire.

[Figures and descriptions of several excellent cheese-presses are given in the first volume of Rural Affairs, pages 209 and 210. Another kind, called the rack and pinion press, is shown on the right hand in the engraving at the head of this article on the Dairy, p. 257. It is one of the best, and is in use in several of the best dairy districts. The figure requires but little description. The rack extends upwards from the follower, and passes the pinion which is inside the frame. The pinion is on the same axle as the rachet-wheel.

Emery Brothers, who manufacture this press, thus describe its workings:—One end of the iron lever which passes across the press, is fastened upon a fulcrum bolt at one side of the press, and passes through an iron guide, and receives the necessary weight upon the extended end. Upon the iron lever near the fulcrum bolt, is attached a hook or pall, which, on raising the weight end of the lever, catches hold of the teeth on the large wheel, and on letting go the lever, the hook pulls upon the large wheel, and by it the pinion is turned in the rack, producing the downward pressure, which continues until the lever rests upon the guide, when the attendant simply raises the lever and weight again, and the hook takes hold of other teeth in the wheel. The whole press weighs about 150 pounds, and suitable for a cheese of 50 to 100 pounds. Price, $12.]

Additional Particulars.—The caseine of the milk gives the cheese its consistency—the butter, its richness. If there is too much butter, as when cheese is made of cream, it is destitute of firmness—if of skimmed milk, it is too hard, and lacks richness. The whole milk is therefore best.

If the temperature of the milk is much above or much below 88° or 90°, when the rennet is applied, too much of the cream will work off with the whey, and the cream will lose in richness.

If a tin vat cannot be had, the evening's milk may be cooled by pouring it into a tub, and setting tin pails in it filled with ice and water; and it may be in like manner heated the next morning to the proper temperature, by setting in tin pails filled with hot water. The fire should never touch the

vessel containing the milk, as a slight scorching will taint and spoil the cheese.

No jarring of the milk should be allowed, even by walking on an unsteady floor, while the milk is curdling, but it should stand perfectly at rest.

The heating of the curd, after it has been cut, is effected by some good cheese makers, who have no vat, by dipping off half or more of the whey, and heating it to about 100 degrees, and returning it to the curd—then, after stirring a few minutes, the whey is again dipped off.

The best way to prepare the rennet for use, is to soak each rennet in a half gallon of water, and then again in another half gallon of fresh water; then put both liquors together, made as salt as can be, and strained and skimmed.

A. L. Fish says, that by adding a gallon of sour whey to enough rennet liquor to curd a hundred pounds of cheese, it increases the effect of the rennet, and prevents cheese puffing, without reducing the amount, as when sourness comes from other causes. He uses a gang of knives, set one-fourth of an inch apart, which cuts up the curd at once, by crossing, into square lumps one quarter of an inch square. A gentle motion is required to prevent their sticking together again.

An intelligent correspondent of the Country Gentleman, with the signature of "D." says:—"The process of *pressing* is more important than many suppose. Commencing gradually, I want your *constant* attention for fifteen minutes, when I want the whole weight of the press in use, and any neglect in following it up, is fatal to the best manufactured curd. I speak advisedly on this subject. I know that careless pressing is the cause of much loss, and your own judgment will confirm this statement. *If you leave whey in your cheese, you may be sure it will find its way out*, and if in warm weather, you will have a worthless, stinking cheese; and even if you do succeed in getting it off your hands, it brings up somewhere, and finally is thrown away, or finds its way to a beer or whiskey-selling groggery, at half price, where bad liquors and worse tobacco have so far vitiated the taste, that nothing but what is rank is palatable."

H. Mills says he gets a better rind in seven days, than otherwise in a month, by placing a cloth at the top and bottom at the time of turning in press, allowing them to remain a week, then taking them off and applying a coat of as warm grease as the hand will bear. Swelling is from a deficiency of salt and scalding. He skims and churns the cream rising during the night.

A dairy, with good cows and good management, will make about 700 lbs. per cow yearly, and each cow will afford about 3 pounds of cheese daily. The size of the cheese, from a given number of cows, may be thus estimated.

RULES FOR MANAGEMENT OF COWS.

Never buy a cow of a dairyman, for if he is a good manager he will sell only his poor animals.

To determine which cows are best for keeping, try their milk separately, and weigh the butter—for sometimes a cow may give much milk and little butter, and *vice versa.*

Cows should run dry six weeks before calving—if milked closely towards calving, the calves will be poorer.

A cow newly come in, should not drink cold water in cold weather, but moderately warm slop. Calves intended for raising, should be taken from the cow within a few days, and they will be less liable to suck when old. Feed them first with new milk for a time—then skim milk—then sour milk—taking care that all changes are gradual, by adding only a portion first, and add gradually a little meal.

Calves well fed and taken care of, with a quart or two of meal daily in winter, will be double the size at two years they would have attained by common treatment.

Heifers thus treated may come in at two years old, and will be better than neglected animals at three, and one year of feeding saved.

Hearty eaters are desirable for cows, and they may usually be selected while calves. A dainty calf will be a dainty cow.

Heifers should become accustomed to be freely handled before calving, and drawing the teats. They will then not be difficult to milk. Begin gradually, and never startle them.

In milking cows, divide the time as nearly as practicable between morning and evening, especially at time of early grass, that the udder may not suffer.

Persons who milk should keep the nails cut short—animals are sometimes hurt with sharp nails, and unjustly charged with restlessness.

Old cows should be fatted at 15 years. The dairyman, therefore, who has 15 cows, should raise a heifer calf every year to supply the vacancy—if the herd is 30 cows, he should raise two calves, and so forth.

Heifers dried up too early after calving, will always run dry about the same time in after years—therefore, be careful to milk closely the first year, until about six weeks before calving.

Spring cows should come in while they are yet fed on hay, and before they are turned to grass, which will be more likely to prevent caked bag and milk fever.

PAVING BARNYARDS.—HIRAM MILLS, of Lewis county, N. Y., thinks he has made a great improvement by paving his entire barnyard with cobble stone, adding greatly to the comfort of the stock, and facilitating the drawing of manure; and also enabling him to clean out all the manure, and keep a neat yard.

RURAL ECONOMY.

Suggestions for Winter.—There are many small matters that require attention in winter. A gate not kept fastened by a good self-fastening latch, and swinging in the wind, will be more injured in a short time, than by months of legitimate use. An equal injury is sustained if the gate has sagged and the latch strikes some other part of the post. Take a mild day, and attend to all of them. It is important to keep latches and hinges greased; and in order to have grease always at hand when wanted, bore an inch hole in some part of the gate-post, put in a lump of tallow, and plug it up. It is then always ready.

Every farmer knows that a gate is rapidly twisted to pieces when it has settled and has to be dragged over the ground every time it is opened and shut. The same injurious result is produced when snow drifts form an obstruction to its motion. All farm gates should therefore be so constructed as to be capable of being raised a foot or two, to avoid the snow. This raising of the gate is accomplished in various ways. One, which answers well where the amount of snow is small, is to make a screw and nut for the lower hinge, so that by turning the nut the hinge is lengthened, and the latch end of the gate raised several inches. Another way is to have two sets of holes through the hinge post, so that the hinges may be changed for summer and winter. A third is to have the gate so made as not to come within a foot and a half of the ground, sliding in a wide board into a groove in the posts whenever small animals are to be shut off. A fourth is the mode here figured and described (fig. 1). The cut represents a horizontal section of the heel piece of the gate, at the hinge. The dark portion is the iron hinge, clasping this heel piece; *a*, the ring which rests on the hook in the fixed post; *b*, a triangular timber, the same length as the heel-piece, and firmly riveted to the hinge; *c*, the heel-piece, which slides up and down in the clasping portion of the hinge; *d*, timber of the gate. Wherever the gate is placed, whether high or low, in the clasping hinge, there it remains, being kept there by its weight hanging outwards against the hinges. It is lowered or depressed in a moment by merely lifting the gate enough to prevent this side weight. The lower hinge should be as much above the lower end of the heel-piece, as it is desired to raise the gate in winter.

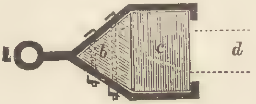


Fig. 1.

Examine stove-pipes, and see that they are all firm and safe. Do not allow the soot to accumulate in them, so that when it gets on fire some windy night it may set the house in flames. Never allow a stove-pipe to pass near wood. Burn the soot out of chimneys at some time when the roof has been wet with rain or melting snow, by lowering a bundle of straw or two from the top, and dropping a blazing wisp upon it. Probably nine-

tenths of the houses that are burned in the country are ignited by the soot taking fire when the shingles are dry, and portions of it dropping on the roof. Keeping the soot well burned out of the chimney, and all that part of the roof near it, or the whole, whitewashed with a mixture of salt and lime, would be worth more and cost less than the best insurance.

What is the reason that so many living and bed-rooms are badly ventilated in winter? One reason is, it is so hard to slide the sash up and down. See to it now, that all are made to slide comfortably and easily, and if they are not hung on pulleys by weights, provide the best and most easily working catches. A few hours time, and a few dimes of expense, may save twenty dollars in doctor's bills, to say nothing of suffering and lost time. Never allow a broken pane to remain a day.

Never allow a squeaking door—pass around once a week, if necessary, and give every hinge and latch a touch with an oiled feather.

Lay in a good supply of wood for next summer. Do not let it lie long in large sticks, but saw and split it up without delay, that it may be drying. Fresh wood quickly dried is far more valuable than half decayed from a long retention of sap. If it can be exposed to the wind for a few weeks before housing, it will dry quite rapidly.

Wedges Rebounding.—Many of our readers cut and split large wood in winter. When the logs are icy, some of them are annoyed by the wedge rebounding or flying back. Ashes dropped in will usually prevent it, but ashes are not commonly at hand in the woods. Take a piece of dry bark and set in the opening, then set in the wedge anew, so as to split this bark, and it will prevent any farther trouble.

Screwing on Nuts.—We have sometimes known nuts on threshing machines, circular saws, &c., to be found so tight that no wrench would remove them. This was because they had been held in the hand till they became warm, and being then applied to very cold screws in winter, they contracted by cooling after on, and thus held the screw with an immovable grasp. Always avoid putting a warm nut on a cold screw: and to remove it, apply a large heated iron in contact with the nut, so as to heat and expand it, and it will loosen at once—or a cloth wet with boiling water will accomplish the same purpose.

Leaky Roofs.—Where a house has been built by one or more additions, the occupants are almost sure to be troubled with leaks. The easiest way to stop them is to introduce suitable cement. White lead paint, with fine sand intermixed to stiffen it according to need, answers a good purpose. Gas tar, or any kind of tar, similarly stiffened, will make an excellent water-proof, frost-proof application. A third, and a very good cement, is made of four pounds of rosin, a pint of linseed oil, and an ounce of red lead, to be applied hot, with a brush. Any person who knows the difference between cold, wet discomfort, and warm and dry enjoyment, should try one of these remedies for a leaky house.

A Horse Fork.—A correspondent of the Country Gentleman gives the following description of a horse pitchfork, which he thinks has cheapness and simplicity to recommend it:—It consists of a simple fork without any latches or springs. The handle is firmly mortised into the head piece, and strengthened by the iron braces at *e*, *e*. To the end of the handle attach the long rope, *a*, which runs through the pulleys. The guy rope, *b*, is attached to the head piece by means of two short ropes, *c*, *c*, of equal length, secured in staples at *d*, *d*. There is no "balancing" to do; but as the fork with its load swings over the beam or into the bay, give the guy rope a slight jerk, requiring but little effort, when the load will drop, the tines slipping out of it, and the fork may be lowered for another. I think it has one advantage over all others that I have seen described, that is, *it is always ready*—no latches or springs to put in place when lowered, but it may be thrust in for another load immediately. There is nothing about it liable to get out of order, and it works with all ease.

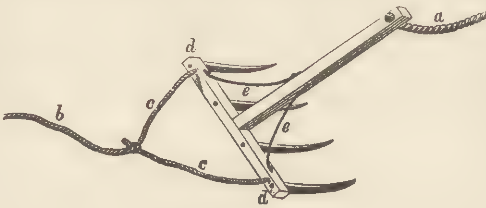


Fig. 2.—Horse Fork.

Painting.—Every farmer has several hundred dollars invested in wagons, carts, machines and implements. Now how much longer would these all last if every crack, joint and pore, were always kept well filled with good oil paint? Probably on an average at least one-third longer than if not painted, and more probably at least twice as long. A great deal may be done by keeping them properly housed; but they must necessarily be more or less exposed in use; the heat opens the cracks in summer, a shower often overtakes them and soaks into these cracks. The process is again and again repeated, and decay begins. An overstrain splits them wider, or breaks certain parts. They must be patched or repaired, or new ones purchased. The farmer who has five hundred dollars thus invested might save from fifty to a hundred dollars a year by keeping a pot of paint always on hand, and on an occasional rainy or spare day go over his machines and implements, and fill with paint such as need it. The pot should have a tight cover, so as to prevent the paint drying, which may be best accomplished by using an earthen jar, with a large cork to fit it. Every farmer should keep a vessel of *white lead* paint—the pure article. This is the best for filling in cracks or joints in small tools—it is good for abrasions on the backs of animals, from harness or yokes—it is good for the scratches in horses that have to travel muddy roads—and it is good to paint the mould-board of a plow to prevent rust after plowing is completed.

To Avoid Running Out of Hay.—Every farmer naturally has an aversion to running out of hay in spring, before grass comes. No one desires to buy that which he ought to have raised, to keep his cattle from starving; and the only alternative, when short of fodder, namely, placing them on short allowance, is still worse. The farmer should know, before he enters winter, whether he has enough feed for all his domestic animals. To ascertain this, many resort to past experience, determining as nearly as they can by guess—often by a very vague kind of guessing. Those who have kept careful record of the number of tons consumed by a given head of cattle, or a certain number of horses, may determine more nearly. Where the cattle and horses have been weighed, and the aggregate weight of the herd thus determined, the estimate may be made with considerable accuracy. Some animals eat more than others for the same weight; a greater difference is occasioned by the severity or mildness of the weather, or the degree of shelter given from the cold; but as a general rule, a horse should have three per cent of his weight daily in food, (hay or grain,) and cattle, which digest better, two and a half per cent. If the farmer has ascertained the number of tons of fodder he has deposited in his barn, he may now, if he understands arithmetic, determine pretty nearly how his hay is likely to run, before grass time. If he has no record of the amount of his hay, he may determine, very nearly, by measuring. First, by finding the length, breadth, and depth of the bay, he at once knows the number of cubic feet. Good solid timothy, the average of a bay 12 or 15 feet deep, will weigh a ton to about 500 cubic feet. If the hay is clover, it will require 600 or 650 for a ton; and if the hay is only 5 or 6 feet deep, add one-sixth more. After determining the number of tons, and the whole weight of all his animals, he may at once know if he has enough. The result will, however, be considerably modified by causes which he has more or less at his control. Regularity in feeding will have its influence; good feeding-racks will prevent much waste; and comfortable shelter will save many tons to every large herd. A skillful farmer informed us, that formerly, when he had just erected a fine new barn, with ample shelter o the best kind, he had learned, as he thought, according to his usual estimate, that he would have to buy hay to complete the wintering of his animals; but on trying his new sheds and stables, so great was the saving actually effected, that he had several tons the next spring to spare.

Highways.—It is an old-fashioned notion that highways were made to travel in, and belong to the traveling public. A few have discovered the error of this opinion, and now employ them for barnyards by setting their buildings upon them—others use them for coarse tool-houses, and pile up old carts, wagons, sleds, rollers, plows, harrows, &c., along their sides; others use them for deposits of rubbish, and throw piles of brush along the fences, and weeds, ashes, leather trimmings, &c., into their centre; others, again, make cattle yards and pastures of them, the cattle helping themselves to their neighbor's cabbages, the horses jumping into their neighbor's wheat

fields, the hogs rooting up the grass walk—and all of them terrifying the little school girls on their way to the district school and returning. We are old-fashioned people, however, and prefer clean, neat roads, and quiet animals in good, sheltered, private barnyards or stables, or in rich pastures with good fences.

LIGHTNING RODS.—A correspondent inquires how to connect the rods on different chimneys of a house, and how to pass them down to the earth. We give the following answer, as an addition to the article on "LIGHTNING RODS," in the last REGISTER. The best is a single rod, with the point extending upwards near the centre of the building, and the rod passing down by the shortest way. Itinerant rod erectors, who charge by the foot, find it to their interest to bristle the roofs of houses and barns with many points, which are connected together by various horizontal pieces of iron, and then with the earth by one or more perpendicular rods. Each chimney is regaded as positively requiring its point, (as shown in fig. 3,) and sometimes several more are added. If these are all perfectly firm and secure, so as never to become displaced, and are well connected with the horizontal portion on the roof, and with the downward one to the earth, they may answer the purpose. But we should much prefer a single rod in the centre, (fig. 4,) supported by a small wood standard, (set in the ridge timbers,) and extending to the earth by bending along down the roof and side wall, in the rear. The expense would be also greatly diminished, inasmuch as one point and one rod are cheaper than several. All that it is necessary to observe is, the point of the rod should be one-half as high above the tops of the chimneys, as the horizontal distance to them from the rod.

Fig. 3.

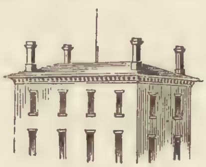


Fig. 4.

The same rule will apply to barns. Fig. 5 shows the way in which three points, (and sometimes more,) are commonly put up on such buildings. A much better mode is exhibited by fig. 6—taking care to secure the requisite height. If a rod always enters water, the water forms a good conductor to dissipate the fluid—but if the water is drawn off below the lower end of the rod, the latter may become a dangerous appendage, by drawing down the lightning without furnishing it a ready means of escape. On the whole, permanently moist earth, which may usually be found at a depth of six or eight feet, may be best.

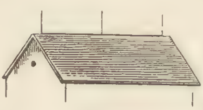


Fig. 5.

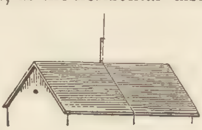


Fig. 6.

The Osier for Bands.—Every farmer should have a small plantation of osier for making bands for binding cornstalks, threshed straw, &c. Rye straw has been extensively used for this purpose, where it is raised and can be procured—but our opinion is that a square rod of the best osier (*Salix purpurea*) is worth nearly an acre of rye. It is also more easily managed, for what a man would carry of the osier in his arms, would bind as much straw or stalks as half a wagon load of rye straw. A great deal of time, as every farmer knows, is wasted in trying to pitch with a fork, cornstalks which have been broken, from badly bound bundles. Willow bands, properly put on, would save all this trouble. During the past very wet autumn, we were compelled to draw into the barn much of the corn crop before husking. It was very easily accomplished by first binding each shock firmly together with osiers, making large bundles, easily handled. When some ingenious inventor shall construct a machine for binding wheat after the reaping machine, by using the shoots of the willow for bands, binding machines may become common. The Salix purpurea may be obtained of many nurserymen, in the form of cuttings, and each cutting a foot long, and two or three years old, or even younger, will soon make a tree, if set in rich mellow ground, upland or otherwise, provided the soil is well cultivated before setting out and for a few years afterwards.

A Tape Line in the Cornfield.—The farmer who does not weigh and measure is like the mariner at sea without log or compass. He cannot know with certainty whether he is drifting towards loss, or advancing towards gain. He works in the dark. But if he can weigh and measure, he knows what practice to reject and what to adopt—making a difference of many thousand dollars in the long run. Every farmer should, therefore, have and use not only a tape line, but a half bushel, a measured wagon-box, a graduated granary, and especially a platform scale, that he may regularly weigh every animal, to ascertain what food and mode of feeding is most profitable, and weigh every load of grain or of hay, to determine the product and the amount he is going to have to use or to spare, and to know the weight of every animal that he offers in market, without the uncertainty of mere guess work. There is no way by which a man may learn to be a *money-making farmer* faster than by this practice intelligently carried out.

How to Shovel Corn from a Wagon.—The Genesee Farmer suggests that a board a few feet long, placed slanting from the top of the end board to the bottom of the wagon before loading, will allow the shovel to be used at once without any preliminary taking out by hand to reach the bottom. The same is true of potatoes or other roots.

Marketing Potatoes.—Solon Robinson says that farmers would save one-fourth of their price by separating the large from the small before sending them to market; the small potatoes only fill up the interstices and lessen the value of the whole, while when separated, the large ones bring a better price, and the small ones left are of considerable value.

Forest Leaves for Litter.—The warmest bedding for domestic animals, especially on plank floors, is perfectly dry forest leaves. They lie in strata, interpose thin plates of air, and thus form a complete non-conductor, and they prevent cold currents of air from passing through. They also form an excellent constituent of manure or compost heaps. They may be easily collected just before winter, in hollows, where prevailing winds have swept them into large beds. Zadoc Pratt collects them by sending a wagon (bark rack) with a capacity of two cords, to the woods, with a man and a number of boys, who collect several cords a day.

Screwing Burrs or Nuts tight.—The wrench should be applied regularly once a week to every nut on every carriage, buggy, wagon or other vehicle, and every implement held by screws, in use. Select a certain period, say the end or beginning of the week, and make it a regular chore. Five minutes will do the whole, and may save many break-downs, and much wear. Some often work loose, and others become loose by the shrinking of the timber.

A Good Smokehouse.—We lately observed a well planned smokehouse on the premises of a good farmer, worthy of a brief description. It was about six feet square, the lower half built of brick, furnished with an iron lined door, and serving as an ashhouse, and place for the fire. The upper part, about four feet high besides the ascent of the roof, was made of wood. It was separated from the lower part by scantling joists, a space of two or three inches between them, through which smoke and air could freely pass, but sufficient to catch any ham that might accidentally fall, and thus save it from the fire. The upper part, as well as the lower, was entered by a door from the outside; this upper door may be kept locked, except when admitting or withdrawing hams; but the lower may be left unlocked, for the hired man to build fires, without any danger of the contents above being stolen, as the thief cannot pass through the openings between the joists.

Corn Marker.—Take a piece of tough scantling, set in a couple of smooth round poles for thills, and between these, behind, a couple of old plow handles, or a bow or frame to answer the same purpose. Then set in below, into large auger holes bored for the purpose, thick stout pins, say three inches wide, six inches long, and inclining backwards. If the scantling is nine feet long, three teeth may be inserted, each four feet apart, or if eight feet long, each may be three and a half feet apart. If the first row is straight, the rest may be kept so, by one tooth passing in the old mark.

Chaff in Animals' Eyes.—Cattle which eat straw from a stack, or thrust their heads into large piles of straw, sometimes get barley beards or oat chaff into their eyes, inflaming and shutting the eye, causing the flow of water from it, and sometimes producing blindness. S. E. Todd states, in the Ohio Farmer, that after trying for a cow partly blinded with oat chaff, the various remedies generally prescribed, including powdered burnt alum blown into the eye, the use of honey, &c., to no purpose, he found the best remedy, and

one entirely effectual, was to take a silk pocket handkerchief, draw it tightly over the end of the finger, and after having raised the lid as much as practicable, thrust the covered finger carefully into the eye. The chaff adhered to it, and was at once brought out. He has always succeeded with this remedy. If the finger is not large, it may be passed all around the ball. The animal, if not gentle, will require tying.

A Scalding Tub.—A correspondent of the Country Gentleman describes a very convenient scalding tub, as follows:—It consists of a box 24 inches deep, 30 inches wide and 4 feet six inches long. One end is put in slanting at an angle of 45 degrees. In the slanting end put five hard wood rollers, 1½ inches in diameter. These rollers are held in their places by two hard wood sticks two inches square, securely fastened to the sides of the box. The rollers should have considerable play, so as to turn easily. I made my box of 1½ inch pine. The advantages of this box over the round tub I find to be three. It is much cheaper, it requires much less water, and is labor-saving. One man can scald a 300 lb. hog alone, with as little hard lifting as two can in the old fashioned tub. Of course it should be made tight and strong.

Skunk Trap.—A correspondent of the Ohio Farmer describes the following very simple but ingenious way of trapping "vermin:"—Every man may catch his own skunks. I have just discovered a new and novel trap for catching these pesky animals. I take an old flour barrel, tack my bait in the bottom, and lay it on two blocks about six or seven inches high, one of which is near the centre; the skunk goes in, steps over the fulcrum, and the barrel rights up on its end with the skunk in it. He can readily be disposed of by throwing him into the water, and then shooting him. I have taken five within a few nights. This is safe against cats, and other domestic animals. Try it.

Farm Improvement.—In seeking to increase the fertility of a farm, "two things," says the Genesee Farmer, "must be borne in mind. One is, that the growth of some crops impoverishes the soil more than others; and secondly, that some crops make *richer manure* than others. Thus, a crop of red clover does not impoverish the soil as much as a crop of timothy grass, while a ton of clover hay will make manure worth half as much again as that made from a ton of timothy hay. The same is true of peas and beans. The manure from a given weight of these is worth double what it is from oats, barley, rye, or Indian corn."

Harvesting Peas.—There are three methods of harvesting field peas—1st, by what is termed *rolling*, or the most improved mode of cutting with the scythe, consisting merely of cutting and rolling over the increasing cut portion like a snowball, until a bunch is made large enough for a fork full. This is rather a slow mode. The second mode, is simply pulling them with a common horse rake, leaving them in winrows; but there must be a strip of unpulled peas under every winrow, which makes pitching slow and laborious.

The third, and best way, is to pull them with a horse rake, but instead of forming a common winrow, drive the horse one side on the cleaned ground, as soon as the rake is full, and empty it there; then drive into the peas and fill it again. This requires more turning the horse, but is on the whole the most economical of labor.

Putting Chain Pumps in Order.—S. E. Todd states, in the Country Gentleman, that chain pumps by continued use get out of order by the chain lengthening or becoming loose. It will then get entangled, and often stop the pump, and breakage frequently follows. To repair the difficulty, take out a few links from the pump, so that it will fit the reel tight, and it will run like a new top.

Improvement in Farming.—In answer to an inquiry at an agricultural meeting, whether the crops generally in the State of New York were decreasing, as some had asserted, A. B. Dickinson said "there was no truth in the statement. Farmers now raise more than their fathers did; live better, dress better, travel more, live in better houses, educate their children better, and are in every way more prosperous."

Experiment in Irrigation.—C. L. Kiersted, of Kingston, N. Y., gives a successful experiment in irrigation, in the New-York Agricultural Transactions. He had four acres of hillside meadow, with rock so near the surface that there was only two to six inches of soil. The grass was about half a ton per acre. Furrows were plowed so as to take the water from a stream over the highest part, making small outlets from the furrows, so as to moisten the whole land. The result was three tons of hay per acre. The next year the irrigation was neglected "and it was less than half a crop." The year following, the water was let on again, with the same good results. The water was passed over the land twice a week—when indications of the grass lodging appeared, the water was withdrawn, and the crop cut. The cost of watering was about two dollars per acre. Other experiments are equally successful.

Advantages of Draining.—An English farmer made an experiment, showing the advantages of draining on the barley crop. A stiff clay field had been well underdrained, and it all ripened early and equally, and the barley sold for 50 shillings per quarter. On another field, not drained, the barley ripened unequally, and brought in market only 37 shillings per quarter.

Clean Land.—As a general rule, such grain crops as are good to accompany seeding down to grass, should be put in very clean land. Wheat is an example; it allows grass to grow freely in it; hence the land should be in perfect order, and made clean by summer fallow if necessary, or the stubble will be full of foreign stuff. On the contrary, such crops as are unfavorable to seeding down, such as oats, buckwheat, and dense corn fodder in drills, are the best to smother down weeds.

FRUITS AND FRUIT CULTURE.

AUTUMN AND SPRING TRANSPLANTING.

The rule must vary somewhat with circumstances. Tender trees, as the peach and apricot, are generally best if set in spring, unless in a warm, dry soil, in a sheltered place, and in a climate not severe. If the aspect is windy, all trees would be better if set in spring. It may be added, that soils rather wet, or liable to become soaked with water before freezing, should never receive trees in autumn. The rule should be carried one step farther; such soils should never be set with trees at all. They are unfit until well drained. Much of the "bad luck" that occurs, is from wet subsoils, with dry surface.

Hardy trees do well for autumn transplanting, if the soil has a dry bottom, and if the place is moderately sheltered from the winds. Apple trees may, however, be shielded from moderate winds, by banking up around the stem, which serves to stiffen them, and also to protect the roots—the mounds to be shoveled down again in the spring. Such mounds also serve to protect against mice, as these animals will never ascend a bank of fresh smooth earth under snow.

As a general rule, all hardy trees are best set in autumn, if soil, aspect, and climate are favorable. They get an earlier start in spring.

It is commonly best to dig up trees in the autumn from nurseries in any case, whether for fall or spring setting. If sent long distances, they will be on hand and may be set out early. They may be heeled in, and be more effectually secured from the effeots of freezing, than if standing in the nursery rows. The roots and most of the stems and branches may be covered with mellow earth. A smooth mound about them, will effectually protect them from mice. It is absolutely essential that all the interstices among the roots be well filled—settling the fine earth, if need be, by pouring in water. If cavities are left, the frost may destroy them. *This is the reason that some persons have been unsuccessful in keeping trees through winter.*

With the precautions above mentioned, it is however a matter of small consequence at which season trees are put out, provided the work is well done. It is *at least a hundred times more important to give them good mellow cultivation afterwards.* Here is where so many fail. Some dig little circles about their trees, which is scarcely better. The whole surface must be cultivated. It is for this reason that trees often do best set in spring—because in one case the soil settles, hardens, and crusts through winter, but is left mellow after spring setting. This difference could not exist if the mellowing of the soil were properly attended to.

Delaware Grape.—Nearly all the observations made in different parts of the country indicate the extreme hardiness of the Delaware, and that it escaped unhurt where other sorts were killed.

Fig. 1.

DWARF APPLES.

For summer and autumn sorts, dwarf apples are valuable in affording a supply to families. They begin to bear in two or three years from setting out, and at five or six years, if well cultivated, will afford a bushel or so to each tree. A portion of a garden as large as the tenth of an acre, may be

planted with forty or fifty trees, without crowding. All the different varieties of the apple may be made Dwarfs by working on the Paradise or Doucain stock—the former are smaller and bear soonest; the latter are larger and ultimately afford the heaviest crops. Among the handsomest growers as dwarfs, are Red Astrachan, Jersey Sweet, Porter, Baldwin, Dyer, Summer Rose, Benoni, and Bough. Fig. 1 shows a Red Astrachan apple tree, on Paradise stock, eight years old, growing on the grounds of ELLWANGER & BARRY, Rochester, N. Y.

RULES FOR TREE PLANTERS.

THE following rules are so self-evident to men of experience, that they seem almost like axioms; and yet they are continually broken by novices in setting out orchards and fruit gardens:

1. If the roots of a tree are frozen out of the ground, and thawed again in contact with air, the tree is killed.

2. If the frozen roots are well buried, filling all cavities before thawing any at all, the tree is uninjured.

3. Manure should never be placed in contact with the roots of a tree, in setting it out, but old finely pulverised earthy compost answers well.

4. Trees should always be set about as deep as they stood before digging up.

5. A small or moderate sized tree at the time of transplanting will usually be a large bearing tree, sooner than a larger tree set out at the same time, and which is checked necessarily in growth by removal.

6. Constant, clean, and mellow cultivation is absolutely necessary at all times for the successful growth of the peach tree, at any age; it is as necessary for a young plum tree, but not quite so much so for an old one; it is nearly as essential for a young apple tree, but much less so for an old orchard; and still less necessary for a middle aged cherry tree.

7. To guard against mice in winter with perfect success, make a small, compact, smooth earth mound nearly a foot high, around the stem of each young orchard tree.

8. Warm valleys, with a rich soil, are more liable to cause destruction to trees or their crops by cold, than moderate hills of more exposure, and with less fertile soil—the cold air settling at the bottom of valleys during the sharpest frosts, and the rich soil making the trees grow too late in autumn, without ripening and hardening their wood.

9. The roots of a tree extend nearly as far on each side as the height of the tree; and hence to dig it up by cutting a circle with a spade half a foot in diameter, cuts off more than nine-tenths of the roots; and to spade a little circle about a young tree not one quarter as far as the roots extend, and call

it "cultivation," is like Falstaff's men claiming spurs and shirt collar for a complete suit.

10. Watering a tree in dry weather affords but temporary relief, and often does more harm than good, by crusting the surface. Keeping the surface constantly mellow is much more valuable and important—or if this cannot be done, mulch well. If watering is ever done from necessity, remove the top earth, pour in the water, and then replace the earth—then mulch, or keep the surface very mellow.

11. Shriveled trees may be made plump before planting, by covering tops and all with earth for several days.

12. Watering trees before they expand their leaves should not be done by pouring water at the roots, but by keeping the bark of the stem and branches frequently or constantly moist. Trees in leaf and in rapid growth, may be watered at the roots, if done properly.

13. Young trees may be manured to great advantage by spreading manure over the roots as far as they extend, or over a circle whose radius is equal to the height of the tree, in autumn or early winter, and spading this manure in, in spring.

14. Never set young trees in a grass field, or among wheat, or other sowed grain. Clover is still worse, as the roots go deep, and rob the tree roots. The whole surface should be clean and mellow; or if any crops are suffered, they should be potatoes, carrots, turnips, or other low hoed crops.

SYSTEMATIC FORMATION OF PYRAMIDS.

[Condensed from the Revue Horticole.]

For more than half a century the practice has existed of pruning fruit trees in the shape of pyramids, or rather cones. But most of them everywhere are so badly formed that they hardly deserve the name. Some are pruned very short every year, and resemble more a thick bush, excluding air and light; others are better directed, but the central stem is seldom in harmony with the lateral branches; this is almost always too short, and the branches too long. It is in order to make this form better understood that I am going to describe it succinctly, in making use of a geometrical figure, (fig. 2.)

The lines extending from the lower branch upwards, and which are united at the stem in the form of a cone, show the relative length to be given each year to the shoots of the lateral branches.

Most pear trees can be brought to this form; the apple with difficulty, but the apricot, cherry, peach and plum trees, are made so to advantage.

The one year tree, for the first pruning, is cut off about 18 inches from the ground; seven or eight side shoots will spring up below this cut. The upper one is to lengthen the stem upwards; the others are for the first set of lateral branches, represented by the two lower shoots in the cut, (fig. 2.)

The upper ones will grow too strongly, and all but the leader must be pinched off when ten inches long; the lower ones may be feeble, or the buds intended to form them may not start. To secure their starting, cut a notch or nick just above them, in spring. Repeat the process the second year, treating the upper shoot, which is to lengthen the stem, precisely as the one year tree had been treated the previous year. Continue the process till the 12th year, when a shorter portion will be left for lengthening the tree, and but two or three buds for side shoots. By the 15th year, the tree will be tall enough.

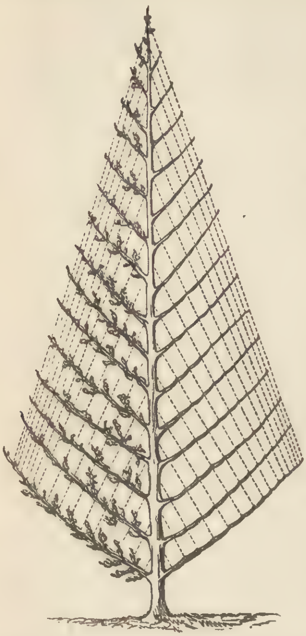


Fig. 2.—Pruning a Pyramidal Fruit Tree. The right hand side shows the branches only; the successive upright lines exhibit the pruning each year. The left hand branches show the fruit spurs.

The side shoots must be cut every year—the upper ones the shortest, and the lower ones the longest—or from about 3 to 8 inches—the upper ones 3 inches, the lower 8 inches, with intermediate lengths between. The 2d year, the new side shoots are to be treated as the lower ones were treated the previous year—and the lower ones be cut back to within eight inches of the previous year's cut. So on in this way, with successive shoots till about the 7th or 8th year, and afterwards, when the side shoots are gradually cut back shorter than before, or to 6, 4, and finally to 2 inches. The pyramid will then be completed, and must be so pruned that it will afterwards grow no larger. It will then be about 17 or 18 feet high, and spread 8 or 9 feet diameter. To attain this size, the tree must be of a vigorous sort, and be well cultivated.

Pears in Illinois.—F. K. Phœnix, of Bloomington, Ill., one of the best pomologists of the west, confirms the opinion we have heretofore expressed, that no pear proves more hardy and reliable in the western states, if as much so, as the Flemish Beauty—a variety, it will be observed, of foreign origin. Out of some fifty sorts which he has largely tried, he finds the following hardy and permanently productive:--Buffum, Onondaga, Oswego Beurre, Belle Lucrative, Rostiezer, Tyson, Seckel, White Doyenne, and Louise Bonne of Jersey.

TWO NATIVE PLUMS.

Fig. 3.—Denniston's Superb.

In addition to the figures of fifteen varieties of the plum, given in the Register for 1861, under the head of "A Basket of Plums," the following excellent sorts are added:

Denniston's Superb.—This is one of the finest of the new varieties raised by the late Isaac Denniston, of Albany, (fig. 3.) It is similar to the Green Gage, but larger. It is a pale yellowish green, with purple blotches and dots, and the moderately juicy rich flesh parts freely from the small stone.

Jefferson.—This is a famous American sort, (fig. 4,) excellent, although it has been overpraised by some. It was raised by Judge Buel. It is large, rich yellow, often with a purplish red cheek; the flesh deep orange, rich and juicy, and nearly parting from the long, pointed stone. It requires high cultivation in most localities, to develope its qualities fully, and the tree is not quite so hardy as some.

These two varieties ripen nearly at the same time, or near the end of summer, the Denniston's Superb a week or two before the last.

New Rochelle Blackberry.—To have this berry in perfection, it must be left on the bush until it is fully rounded, intensely black, and drops from the stalk by a touch; it will then be sweet and juicy. If taken earlier, even when black, the berries will be hard and sour. The Homestead says, that unlike common blackberries, which are *red* when they are *green*, these continue *green* after they become *black*.

SENDING BUDS BY MAIL.

SINCE the postage law has been amended, so as to allow the transmission of buds and grafts by mail, at a cheap rate, many more than formerly will now probably be forwarded in this way. The question is often asked, "How far can you send buds safely by mail?" The answer must depend greatly on circumstances. If cut and put up quite early in summer, while in a green, growing and succulent state, they will scarcely keep in good condition more than a day or two. If, on the other hand, the shoots are well ripened and hardened, they may be kept a week, or even a fortnight. There are some kinds of trees which cease growing by midsummer, form their terminal buds, and ripen their wood; and on a high, dry, and hard soil, not cultivated, some trees will have matured shoots a month or two sooner than the same kinds on richer and more highly cultivated grounds. From such early ripening trees, the buds may be cut and sent soon.

Fig. 4.—JEFFERSON PLUM.

There are two ways of putting them up—one in oil-silk cases, made by making a water-tight covering of the oil-silk, by wrapping it around the sides and ends, and closing every crack by passing fine thread many times around, until no moisture can escape from within. They cannot therefore dry, and they remain fresh and plump. If dipped in water just before wrapping up, there will be about enough moisture to spare, to saturate the air within. Without this precaution, some moisture will escape to the confined air, and the shoots may become slightly shriveled. Not more than a dozen shoots should be placed within each oil-silk case, as a larger number cannot be securely wrapped. Any number of

these cases may be placed in one package, not exceeding eight ounces, and sent by mail for one cent per ounce under 1,500 miles, and two cents over that distance.

The other mode of packing, is in damp moss, a safer mode, but more expensive, as the moss in which they are imbedded should weigh nearly as much as the shoots. The best mode of all, is to fill all the interstices of the shoots with finely pulverized damp moss, and then encase the whole in thin oil-cloth. The moss retains the moisture, and protects the shoots from bruising, and the oil-cloth prevents the exterior portions from drying.

SHORTENING-IN THE PEACH.

Fig. 5.

PEACH trees tend constantly to grow at the tips of the branches, and not at the sides. In this way the limbs gradually elongate, and become like bare poles, with tufts of leaves on the ends. After a lapse of years, if allowed to grow thus, they become almost worthless, bearing small poor fruit and little of it, and spreading out and occupying much room, (fig. 5.)

To prevent this unfavorable result, the limbs should be kept shortened in, so as not to extend beyond due limits. This will prevent their becoming bare of foliage inside, and the crop will be evenly distributed over the head, (fig. 6.) The operation may be performed by cutting off early each spring, before the buds swell, one-half or two-thirds of each of last year's shoots, with as many of the smaller side shoots close to the branches as will keep the head sufficiently open and prevent too thick and dense a growth of leaves. The process, in this case, is to be repeated annually. Or, it may be done once in two or three years, by cutting off larger portions, or two or

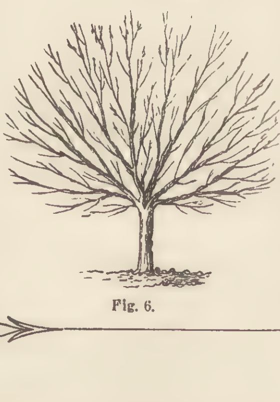


Fig. 6.

three feet back, being careful to make each cut at a fork, so as to leave no stump. Peach trees, as commonly raised, spread over a surface of twenty feet or more, in the course of years. If kept properly shortened in, twelve feet, or at most fifteen feet, is enough for one tree.

CONSTRUCTION OF A CHEAP GRAPERY.

BY JOSIAH SALTER, ROCHESTER.

I HEREWITH give you a rough sketch, showing how a neat, cheap, durable and effectual cold grapery may be built by any ingenious carpenter. It is a span-roofed house, 24 by 24 feet, which can, of course, be extended to any length, retaining the same width and height. A house built 24 feet wide, 48 feet long, 5 feet high at eaves, and 10 feet high at apex, makes a well proportioned and good looking cold grapery.

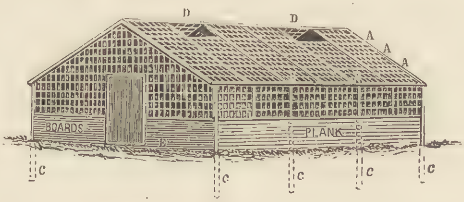


Fig. 7.

A A A. Perlins, which may be sunk into the rafters one inch. The sash-bars nailed on the perlins, at proper distance for 7 by 9 glass —B B B B. Rafters.—C C C C. Cedar posts. D D. Ventilators.—E. Ground level. The lower part marked matched boards is 2½ feet, boarded up—that marked plank is two feet, planked up for the earth of the border to rest against. The glass at the sides and ends may be upright sash-bars only; no thick pieces needed; the bars will be abundantly strong.

A house of these dimensions, viz., 24 by 24 feet, will take 11 red or white cedar posts, at least 8 feet long—5 on each side and 1 for the middle of the end *opposite* the door; 18 pieces 2 by 4 pine scantling, each 12 feet long, for water table, plate, ridge pole, &c.; 18 pieces 2 by 4 scantling, each 14 feet long, for rafters; 12 pieces 2 inch square and 12 feet long, for perlins; about 100 sash bars 1 inch thick, 1½ inch deep, with ½ inch tongue for bedding the glass in, and each 14 feet long; a few pieces of casing and capping for the ends and ridge pole; 1 piece 4 inch square, for pillar in middle of house, to support the ridge pole; about 150 feet match boards, and if the border is entirely outside the house, about 48 feet 2-inch plank to keep up the earth of the border. Tin gutters at $5, cistern at $3, cast iron pump and watering can with rose spout; about 20 boxes of 7 by 9 Oneida extra thick glass, at probably $2 per box, 50 feet in a box; paint, putty, &c.

I think this house could be built complete, not including border and vines, for $150.

As good grapes, and of as fine quality, can be grown in this house as in the finest and most costly structure, and probably with more ease and certainty. This house will last, with a little repair, from 15 to 20 years, and produces 200 pounds of grapes yearly, worth 50 cents per pound. This is allowing a little less than 12 pounds to the rafter of 14 feet; a vine of this length will frequently give from 15 to 20, and even 25 pounds.

The half of this house, of course, would make a leanto, which should face the south; the whole a span-roof, which should run north and south, and face east and west.

You inquire, "What portion of a man's time, and for how much of the year, would be needed for its care?" The time needed for a house of this size would be merely nominal. I should say one day in two weeks, from the 15th of April to the 15th of November, would be all that would be needed if it could be all put into whole days.

A good hand would do all the work of such a vinery in one hour a day, on an average, for weeks at a time; occasionally one whole day would be needed at thinning and pruning time. It is not the time taken, but the little attentions at all and at any time that may be required, and the knowing when and how and what to do, or the not knowing, which sometimes prevent or produce unfavorable results in graperies.

But pray let me discourage no one, for I know of no fruit so beautiful, so healthful, so luscious, and so pleasing to every one, that can be grown with so much ease and certainty, which may be cut fresh from the vine every day, in the acme of perfection, for so long a season as the grape. The grape may be had in perfection every day, from the same vinery, for five months in the year. I have cut my first Dutch Sweetwater on the 28th of July, and my last Prince Albert on the 15th November, from the same cold vinery, and kept the latter variety in a dry garret until Christmas.

Even more than this can be done with some of the later ripening and long-keeping kinds, by the assistance of a gentle warmth from a hot-water pipe, to expel damp and frost during October, November, December and January.

Allow me to ask what other ripe fruit can be had in perfection for so long a season? It will take all the varieties of peach and plum, and nearly all the varieties of pears, and I was going to say, all the varieties of apples, combined, to furnish so much ripe table fruit without intermission for so long a season.

THE CLINTON GRAPE.—This grape, although not of first rate quality, and entirely rejected by some on account of its austere flavor, appears to be an admirable keeper. Cultivators who have made the experiment, have not found it difficult to keep till spring—when its peculiar quality is more grateful than at some other periods of the year.

GOOSEBERRIES.

The best English Gooseberries, for this country, are the Crowm Bob, (fig. 8,) and Whitesmith, (fig. 9.) The accompanying figures represent the natural size and form of these berries when fully grown, on well pruned bushes, standing in good cultivated soil. As commonly cultivated, they are about half this size. But a serious objection is their liability to mildew after bearing one or two crops; an evil that may for a time be averted by good cultivation and pruning, and mulching in summer. The most valuable gooseberry, however, for common culture, all things considered, is Houghton's. It grows freely, is easily propagated, and in most localities never mildews. It is a profuse bearer. The cut (fig. 10) shows a portion of a branch, with berries of the average size under common culture. Branches loaded as densely, a foot or two long, are generally found on every bush. Under pruning and high cultivation, with some thinning of the berries, they grow larger. The Mountain Seedling is similar, larger, but with thicker skin. There are two or three sub-varieties, among which is the American Seedling, very nearly resembling the Houghton. A spurious sort has been widely disseminated under the latter name.

Fig. 8.—Crown Bob.

Fig. 9.—Whitesmith.

Fig. 10.—Houghton's Seedling.

The Houghton gooseberry is an excellent sort for bottling for winter use. The process is exceedingly simple and easy, no heat nor cooking being required. Pick the berries while yet *quite green*, and before the ripening process has even commenced. If done later, they will not keep. Clip off the stem and calyx with sharp scissors, and then pack them in glass jars, shaking them down well, and pressing them closely, but not so as to crack or injure them. Then cork them, rendering the bottles tight with grafting-wax or sealing-wax. Place the bottles in a box in a cold cellar, imbedded in dry sawdust. They will be in fine order the following winter.

TIME FOR PRUNING ORCHARDS.

This subject was fully discussed at a late meeting of the Fruit Growers' Society of Western New-York, and men of experience were nearly unanimous in the opinion that all severe or heavy pruning should be done in winter, or before the flow of sap in spring. If performed in spring, the sap runs out and injures the wood of the wound; and after the leaves have expanded, the loss of the foliage injures or checks the growth of the remaining portions of the tree. It was admitted, however, that light pruning, for the removal of an occasional limb, might be performed late in spring and summer, and at this time the wound healed best. Large wounds made in winter should be covered with paint, tar and whiting, or what is best, shellac in alcohol. Unless pruning has been neglected when the trees are young, very little is needed as they become older.

FRUIT vs. MALARIA.

RESIDENTS in the Western States, and other regions where intermittents and similar diseases result from malaria, state that a regular supply of ripe, home-grown fruit, is almost a sure preventive. Eat the fruit only when fully ripe, and eat only moderate quantities at a time, and little need be feared. The residents of such regions should, therefore, not omit the earliest opportunity for a supply. Plant large quantities of strawberries for early summer—they will bear abundantly a year from the time they become established. Plant many currant bushes—for these are a most healthy and excellent fruit—very hardy—and if in abundance, will last through all the hottest parts of the summer. The Doolittle and Orange raspberries are profuse bearers—the former very hardy, the latter generally so, but should be laid down and covered with an inch or two of earth for winter. The Rochelle blackberry, if pinched in when three or four feet high, (about midsummer,) will bear abundantly, and prove hardier than if the canes run up without control. The Delaware, Clinton and Concord grapes, are early and hardy, and will bear in two or three years from transplanting. Dwarf apples, on the Paradise and Doucin stock, will flourish in any locality, and begin to bear profusely in three or four years, and on the Paradise stock often in two years. Some varieties bear early on common stock; such, for example, as the Dyer, Lowell, Early Strawberry, Sops of Wine, Oldenburgh, Porter, Belmont, Jonathan, &c., but these will, of course, bear much sooner as dwarfs. The Bartlett, Washington, Julienne, Flemish Beauty, Beurre d'Amalis, Onondaga, Howell and Seckel pears, produce early as standards, and the Louise Bonne of Jersey as a dwarf. Houghton's gooseberry grows with great vigor, is very hardy, and in two or three years affords almost solid masses of berries on the branches. Such fruits as the above should be planted out on every new place, as indispensible to health as well as to comfort and economy; and emigrants to new countries should take a supply with them, as the best medicine chest they can provide.

PEARS AND SHELTER.—A correspondent of the Prairie Farmer describes a new mode of planting evergreens to protect orchard trees, adopted on the grounds of ROBERT DOUGLASS, near Chicago. The evergreen trees alternate and are interspersed all through the orchard. The result is entire success. When the trees become large, and require more space and less shelter, the evergreens are to be cut out, and will bring a good price for the timber. In some portions of the grounds described, where this mode is so satisfactorily adopted, underdraining, effected by laying three narrow fence-boards nailed together, in the place of tile, has been attended with the best results, and the water has been seen to continue to run from these even when the surface appeared to be quite dry.

DWARF CHERRIES.

THESE are raised by budding any variety on the Mahaleb stock. For a few years they grow as rapidly as on other cherry stocks, but never attain a very large size. The Dukes and Morellos form the handsomest dwarfs. The

Mahaleb has another advantage—it gives greater hardiness, and better fits the Heart cherries for heavier soils, and for some other unfavorable influences. The Morello also makes a good dwarf stock, and this is the best and surest way to raise cherries for some portions of the west, where they will succeed in no other way. The Dukes worked on Morello stocks are extremely hardy.

The figure here given, (Knight's Early Black, ten years old,) does not show the profuse bearing often witnessed on dwarf cherries, the branches sometimes presenting almost solid masses of fruit. Dwarf cherry trees, on the grounds of the writer, trained as pyramids, are often loaded down to the ground, and are beautiful in appearance, while the fruit is easily picked, without the aid of stools and ladders.

STRAWBERRIES—QUICK RETURNS.

Those who have new places desire to be supplied with fruit of their own growing, as soon as possible. This may be quickly effected by planting strawberry beds. We have had a moderate crop, and fine berries, five weeks from the time the plants were set out. Blocks or masses were dug up with a spade, and set in corresponding excavations made in straight lines, by a stretched cord. Some were in blossom, but there was no check in growth. The best way is to cut the blocks in regular lines, from a bed which has been previously allowed to run into a mass. Let the new bed be well prepared previously, and smooth even furrows six inches wide at bottom, three inches deep, and about two feet asunder, be cut and shoveled out with a narrow spade. Or, 8 inches wide will do quite as well, and give longer roots. Then, by means of stretched lines across the old bed, cut strips of strawberry turf a corresponding width, and three inches deep, and place these blocks a foot apart in the furrows. Fill the intervening portions of the furrows, and the bed is done. A hand-cart or barrow answers well to convey the blocks. Strips having been left in the old bed, and the spaces dug out filled with rich earth or compost, these beds are finely renewed.

Manuring Orchards.—If the trees are unproductive simply because they are unthrifty in growth, the application of yard or stable manure, with a portion of ashes—or in the absence of ashes, of lime—will probably be the best thing. The application should be made in autumn, that the soil may be soaked in winter and spring. If only top-dressed, the autumn application is of great importance. If plowed in, it is done most advantageously in spring, after the manure has remained all winter on the surface. It sometimes happens that ashes or lime alone will restore the productiveness. A good deal depends on the character and condition of the soil, which can be determined only by experiment. As a general rule, however, common manure, with one-tenth to one-twentieth ashes or lime, will be useful in nearly all cases.

PRUNING THE QUINCE.

Fig. 13.

Fig. 12.

The common orange quince is one of the many trees that suffer by the neglect of the owners. Generally, the trees receive no care at all, but grow up a thick mass of brush, (like fig. 12.) In this condition, they bear sparingly a small poor fruit. Such masses of growth may be thinned by cutting out all the crooked and close growing shoots, and by cultivating the soil, they will then yield more and better quinces. If, however, they are kept in the neat, low tree form, (shown in fig. 13,) with open thrifty heads, and old manure or a compost of manure and muck and some ashes, applied and well worked into the cultivated surface, the fruit furnished will be much greater in quantity and incomparably finer.

Covering Half-Hardy Grapevines.—One of the very best modes, where plenty of evergreen boughs may be had, is to lay the vines down, and then cover them with these boughs. They need not be laid so flat as a covering with earth requires. If the vine is of some variety that is but slightly tender, a very little protection will answer; but those more likely to be killed may have several inches of the evergreen leaves lying over them. When the vines are not fully ripened in growth, wet earth sometimes rather injures than assists, by increasing the tendency to decay; but this can never happen with a mantle of evergreen boughs.

Rosin Smoke for Aphides.—A correspondent of the Revue Horticole, states that he has used successfully for some years, the smoke of rosin, instead of tobacco smoke, for destroying or repelling aphides on plants. Rosin, as all are aware, is very cheap, produces much smoke, and is much less offensive than tobacco to most horticulturists. It is worthy of trial on such delicate plants as roses, &c., that happen to be infested with aphides.

The Black-Knot.—H. T. Brooks, of Wyoming Co., N. Y., says he had determined either to kill his plum trees or the black-knot. The consequence was that he killed or kept off the knot and saved the trees. This is unquestionably the right determination. Those who try to save both, (by neglect,) save the knots only, and these in abundance. Prompt excision at all times will make short work of the disease.

SELECT LISTS OF APPLES.

Apples for Family Use.—A vote was taken in the winter of 1862, at Rochester, at a meeting of the Fruit Growers' Society, for the best 24 apples for family use, embracing a portion for stewing and baking, with the following aggregate result:

	VOTES
Tallman Sweeting (baking)	14
Rhode Island Greening	13
Red Astrachan, Sweet Bough, Tompkins Co. King, Northern Spy, Baldwin, each	12
Primate, Twenty Ounce	10
Gravenstein	9
Early Strawberry, Early Harvest, Golden Sweet, (baking,) Golden Russet, Esopus Spitzenburgh, each	8
Duchess of Oldenburgh, Porter, Munson Sweet, Peck's Pleasant, Fameuse, Roxbury Russet	7
Wagener, Swaar	6
Yellow Bellflower, Red Canada, Ladies' Sweeting, Summer Rose	5
Pomme Grise	4
Jeffries, Green Sweet, Monmouth Pippin, Benoni, Dyer, Baily Sweet, Jersey Sweet, Early Joe	3
Belmont, Beauty of Kent, Calvert, Fall Pippin, Canada Reinette, Rawles' Janet, Seek-no-further, Cooper's Market, Mother	2

St. Lawrence, Keswick Codlin, Early Summer Pearmain, Lowell, Fall Jenneting, Pumpkin Sweet, Ribston Pippin, Vandevere, Maiden's Blush, Minister, Smith's Cider, Melon, Blue Pearmain, Jonathan, each one vote.

Apples in Missouri.—A Horticultural Society in the neighborhood of St. Louis, has made out the following list of 16 sorts of apples, for 100 trees:

8 Early Harvest,	5 Maiden's Blush,	5 Yellow Bell Flower,	10 Michael Henry Pippin,
2 Red June,	5 McKinley,	10 Ortley,	5 Pryor's Red,
3 Golden Sweet,	2 Fall Pippin,	4 Peck's Pleasant,	15 Newtown Pippin,
8 Fall Queen,	10 Rambo,	8 Winesap,	10 Rawles' Janet.

They are named nearly in the order of ripening. The McKinley is a large, showy, good apple, which originated in that region. All the others are described in the fruit books.

Management of Fruit Trees.—Dr. Kennicott, in a late essay on this subject, makes some very just remarks. He says "a crop of rye, barley, oats or wheat, in a young orchard, is worse than fire-blight or caterpillars"—that "fruit trees need as much cultivation as corn and potatoes, not for one year or five, but forever, or as long as they bear fruit." Cultivation, he adds, should not be continued late in summer, for half-hardy trees, as peaches, but the wood allowed to harden and ripen. He says that "as commonly practiced, orchard trees need pruning about as much as cow's horns—and that most of the shaping should be done in the nursery, or during the first three or four years." In the rich west he would apply no manure to orchards till the trees had been years in bearing. He would spread it broadcast in autumn, not at the foot of the trunk as is sometimes done, and where the roots cannot get it. Plow it under slightly in spring.

LABELS FOR FRUIT TREES.

A GOOD, durable, and very cheap label for standard or bearing trees, is made of sheet tin. Cut the tin in strips about six inches long, somewhat in the form of a wedge, about a fourth of an inch wide at one end, and three-fourths at the other. Write the name near the wide end, with any sharp steel instrument, as an awl, or end of a file ground sharp, bearing on hard enough to go through the tin coating, and reaching the iron. (In a few months the rain, by penetrating to the iron, will rust it, and make the name quite conspicuous.) The label is then attached to the tree by bending the narrow end once about a side limb, (fig. 14.) As the tree grows this coil will expand, and not cut the bark. On this account thin tin plate is better than thick. The coil should pass around but once, or it will not give way freely to the increase of growth.

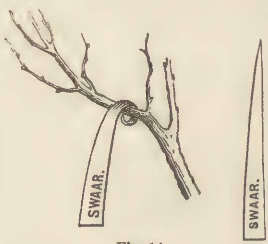


Fig. 14.

This label is so simple that it can never get out of order, being nothing else than a single strip of tin; and any tin worker will cut them of scrap or refuse plate for about ten or fifteen cents per hundred. We have given them a full trial, and know their success.

SELECT LISTS OF GRAPES.

LIST OF PROFITABLE GRAPES.—At the winter meeting of the Fruit Growers' Society, at Rochester, in 1862, the following vote was given by the prominent grape growers present

	VOTES.
Concord	7
Delaware	7
Isabella	6
Diana	6
Hartford Prolific	5

Rebecca, Catawba, To Kalon, and Northern Muscadine, each two; and Clinton, Perkins, Oporto, and Union Village, each one vote.

VOTE ON GRAPES.—At the meeting of the Grape Growers' Convention, at Lancaster, Pa., the following vote was taken on the six best table grapes, and the three best for wine:

FOR TABLE—	VOTES.		VOTES.	FOR WINE—	VOTES.
Concord	21	Diana	15	Clinton	8
Delaware	20	Rebecca	11	Catawba	7
Isabella	16	Maxatawney	8	Delaware	4

INSECTS.

BY ASA FITCH, M. D., STATE ENTOMOLOGIST, SALEM, NEW-YORK.

[Written expressly for the Illustrated Annual Register of Rural Affairs.]

THE term "insect" has allusion to one of the most conspicuous marks or characters whereby this class of objects is distinguished from other animals. They not only have a neck separating the head from the body, but near the middle of their bodies is a second neck dividing the body itself into two portions. Hence they have received this name, insect, from the Latin words *in* and *secti*, i. e. cut in or insected, their bodies appearing as though they were cut in two. And from the corresponding Greek word, *en-toma*, comes the term "entomology," the name of the science which treats of this class of animals.

In consequence of their small size, and the obscure situations in which a large portion of them lurk, insects are but little noticed or known, yet they constitute the most numerous class of objects in our world. It is commonly estimated that six times as many kinds of insects will be found as there are plants and trees in any district of country. This will serve to give us some conception of their immense numbers, and also of the singular and almost endless diversity of forms that must exist in the works of nature around us, to constitute such a vast series of objects, each one different from all the others. And this diversity becomes still more astonishing when we recur to the additional fact that each one of these creatures undergoes certain changes in its form, whereby at different periods of its life it becomes a totally different object, apparently, from what it previously was—changes very similar to what it would be for a serpent to become a clam or oyster and this clam to subsequently change into a bird.

These changes are termed the metamorphosis or transformations of the insects. There are four distinct forms in which insects exist, or four different states or stages of their lives. These are the egg, the larva, the pupa and the imago or perfect states.

1st. The EGGS of insects (illustrations of some of which may be seen in the following pages, figs. 10, 27 and 34 *b* and *c*) are seldom larger than a mustard seed, and are very often so minute as to be invisible to the eye. They are most commonly white, yellow or pale green, and of a globular (fig. 27,) an oval (fig. 34 *c*,) or an oblong (fig. 10) form. They are always placed upon or near the appropriate food for its young by the parent, who gives them no further care, (except in a few instances, bees and ants, e. g.,) and are incubated by the warmth and moisture of the atmosphere. The inclosed insect, to come out does not break the shell, but gnaws through it, and often consumes nearly all the shell and the gummy substance with which the shell is frequently coated, before it resorts to other food. Its infantile jaws are unable to do this when the shell is dry and hard. Hence, it is when the

shells are softened by damp and rainy weather that insects hatch. If an apple tree limb containing the ring of eggs of the moth which produces the caterpillar, is brought into a stove-warmed room where it is kept dry, the young caterpillars are unable to make their escape from the eggs, and thus perish.

2d. The LARVA, in the plural LARVÆ. This word is in more current use in this its technical than in its English form, larve and larves. In this state the insect is what in common language we term a worm (figs. 12, 18, 28 and 34 *e*, *f*.) All the worms which it is common for us to see around us, are the larvæ of insects, with but two or three exceptions, namely, the angle or earth worm and the leech or blood-sucker. These always remain in the same form in which we are accustomed to see them, and their bodies are made up of numerous rings or joints, whereas in the larvæ of insects the number of joints is always thirteen. A larva which is destitute of feet and of a distinct head is termed a maggot, (figs. 12, 18.) Those which have a head but no feet are termed grubs. Larvæ whose bodies are clothed with hairs we usually term caterpillars, though in books this name is given to all larvæ which change into butterflies or moths, whether they are naked or hairy. There are some kinds of insects, however, which never have the worm-like form, but when they come from the egg they are similar in appearance to their parents, except that they are smaller in size and wholly destitute of wings. Such are the grass-hoppers, plant bugs, leaf-hoppers, plant lice, and all the insects akin to them. It is in the larva stage of their lives that insects obtain their growth. They consequently eat most greedily at this time, and are usually the most injurious. They become more voracious as they increase in size, and the quantity of food they gorge down is often enormous. The maggots of the flesh flies consume 150 times their own weight in twenty-four hours, hereby augmenting their own weight sevenfold in that space of time. As the larva thus increases in size, its skin becomes too small to contain it; the old skin thereupon becomes separated from the body, cracks open upon the back, and the worm crawls out of it. The new skin in which it thus becomes dressed as in a new suit of clothes, is frequently of a different and brighter color and more ornamented with spots and marks than the old one, whereby the worm appears like a different species from that which was previously seen. It thus changes its skin, or "moults," as it is termed, three times, and in many species oftener, five and even eight and ten times, at intervals of from one to three weeks. Finally, having completed its growth, it crawls into the ground or under the loose bark of a tree or other sheltered place and casts off its skin again, and loses therewith its legs and its mouth, whereby it is unable to move or to eat. It is now in its third form.

3d. The PUPA, plural PUPÆ, in English pupe and pupes, (fig. 19.) In this state the insect lies dormant and motionless, being frequently enclosed in a "cocoon," a ball or pod of silken threads spun around itself by the larva as its last act before changing to this form. The pupa most frequently has the shape of an elongated egg, with a hard glossy shell of a chestnut brown

color, its smaller end divided into rings or joints and its larger end showing a few impressed grooves running obliquely, which are the sutures between the sheaths containing the wings and legs in their embryo state. The pupa of a butterfly or moth is termed a chrysalis. The pupæ of grasshoppers, plant bugs and other insects which do not undergo a complete transformation, are termed nymphs. These feed and continue active during their pupa state, which only differs from the larva in being larger and possessing wing sheaths resembling small scales appressed one upon each side of the back. It is in this pupa state that a large portion of the species repose during the winter. The outer shell at length cracks open upon the fore part of the back, and the insect extricates itself therefrom.

4th. The IMAGO, plural IMAGINES, the adult or perfect insect. When this first comes from the pupa shell it is usually a soft, flaccid, unwieldy, misshapen mass, which requires to remain quiescent for a short time for its superabundant fluids to evaporate, its wings to unfold, and all its parts to acquire their requisite form, strength and solidity. And at the same time, several drops of an opake fluid like thin paint of a red, white or yellow color, are discharged from the interior of the body, at least of the larger sized moths and butterflies. In former times, before this fact was known, a whole brood of a particular species happening to come out on a single night in summer, has so covered the leaves and grass with these drops, over a considerable extent of country, as to lead to the confident belief that a shower of blood had fallen—a phenomenon which would naturally be regarded as an omen of most alarming portent. TASSO thrillingly introduces this in picturing the horrors of the night on which the Saracens fell upon the camp of the slumbering Crusaders. (Jerusalem Delivered, canto ix, stanza 15, Wiffen's translation.)

> "Through heaven malignant goblins flew,
> And the chill skies, in lieu of hoar frost, shed
> On earth the semblance of a bloody dew."

The entomologist, however, will notice in these lines that the great poet was unaware that this phenomenon of bloody rain or dew never occurs upon a chilly night, it being on warm sultry nights only that insects in any considerable numbers change from their pupa to their perfect states.

An insect is known to be fully grown and in its perfect state, if it has wings; and those species which never acquire wings are known to be perfect if we find them depositing their eggs. Its body is now divided into three principal parts (see fig. 20, and others,) namely, the head, the thorax or fore body, and the abdomen or hind body, the two latter parts showing joints or sutures dividing them into rings, of which there are three to the thorax and nine to the abdomen, making with the head thirteen segments or rings, the same number as in the larva, though in the imago some of these divisions are variously modified, and the two last ones are usually retracted within the body, whereby only seven segments to the abdomen, and sometimes fewer than this, are to be seen externally.

The head is furnished with two important appendages not possessed by any other animals, except the lobster and its kindred. These are the *antennæ* or horns, a pair of organs usually of a long, slender, thread-like form, but differing greatly in different insects. To many insects these appear to be the most serviceable of any of their members, guiding and directing them in all their movements. Thus two bees or ants on meeting each other, immediately touch their antennæ together, whereby they instantly discover whether they belong to the same or to different hives or hillocks—as though they had some sign of free-masonry, by which, on thus shaking hands as it were, they know whether they are brethren or strangers to each other. An Ichneumon-fly by merely touching its antennæ over the bark of a tree, ascertains whether there is a worm underneath, even when it is lying in the wood two or three inches deep—it detects the precise point where it is lying, so accurately that it is able with its long bristle-like sting to pierce the wood, puncture the worm, and insert an egg under its skin. From such facts some have supposed that the antennæ are the organs of some sense wholly different from any of those possessed by the human race, and of which it is therefore impossible for us to form any conception. Others think it is the sense of feeling possessed in a very delicate and acute degree by the antennæ which enables them to discover such things.

The head is also furnished with two eyes, which are compound and large, sometimes occupying almost the whole surface of this part. It also has either a mouth with jaws and palpi or feelers, or a proboscis or trunk for sucking fluids. From this last character insects are separated into two grand divisions, namely, the MANDIBULATED, those which have mandibles or jaws for gnawing and chewing *solid substances*, and the SUCTORIAL, those with a trunk for sucking the juices of leaves, the honey of flowers, the blood of animals, or other *fluid substances*.

The thorax bears the organs of locomotion, namely, the legs and wings. All insects have three pairs of legs, an anterior, middle and hind pair. The wings are wholly wanting in some of the more minute kinds of insects; but when present they are sometimes two, but in most cases four in number. The forward pair, however, is often of a very different texture and form from the hind pair, and not adapted for flight but merely serving to cover and protect the lower pair when folded and not in use, and in such instances they are termed elytra or wing-covers. And it is upon these differences in the number and modification of the wings that insects are divided into orders. Eight orders of insects are usually reckoned, though some writers make the number more than this by subdividing some of these into two or more. These orders are so few and so easily distinguished that a little observation enables any one to correctly refer almost every insect he meets with to the order to which it pertains. In the three first of these orders the fore wings are different in their texture from the hind ones; in the three next the texture of both pairs is the same, and in the two last orders one or both pairs of wings are wanting.

In the first order, Coleoptera, the fore wings are of a hard, crustaceous or shell-like texture, and are wholly destitute of veins. The common name, *beetles*, appropriately belongs to the insects of this order, such as the curculio, apple tree borer, May beetle, lady bug, &c. Figs. 1, 3, 29, 33 and 34 *a* are examples of this order.

Order 2d, Orthoptera, has the fore wings of a leathery texture, like parchment. Grasshoppers, crickets and cockroaches comprise nearly all the insects of this order.

Order 3d. Hemiptera. Suctorial insects with the fore wings usually leathery and opake on the basal half, the remainder being membranous and transparent. To these the name *bugs* appropriately belongs, and not to any other insects; as the chinch bug, squash bug, &c. (fig. 21.) A sub-order, Homoptera, has the fore wings wholly of one texture, either membranous and glass-like or leathery and opake, as the seventeen-year locust, leaf hoppers, tree hoppers, plant lice, &c., (fig. 24.)

Order 4th. Neuroptera. Four transparent wings of equal size, and with numerous veins giving them a net-like appearance. Dragon flies or darning needles, golden-eyed flies, lace-wing flies, &c., (fig. 26.)

Order 5th. Hymenoptera. Four transparent wings, the hind pair smaller, and with but few veins. Bees, wasps, ants, ichneumon-flies, &c., (fig. 20.)

Order 6th. Lepidoptera. Four large opake wings, covered with fine meal-like scales. These are suctorial insects, with their trunks coiled like a watch-spring. Butterflies, millers, moths, (figs. 2, 5, 22 and 30.)

Order 7th. Diptera. Only two wings. Suctorial insects. House fly, horse flies, musketos, midges, &c., (figs. 6 and 7, 14 31.)

Order 8th. Aptera. Destitute of wings. Many of these are suctorial. Fleas, lice, centipedes. Spiders, the gray-beard or daddy long-legs, mites and ticks, having four pairs of legs and no antennæ, are usually placed also under this order, though modern science inclines to regard these as forming a class of animals distinct from true insects.

Each of these orders is subdivided into a number of smaller groups, termed families or tribes, each family embracing several genera, and each genus containing one or more species. Thus insects, like a vast army, are divided into brigades, (orders,) regiments, (families,) companies, (genera,) and individual soldiers, (species.) And to clearly designate any one of these soldiers, it is necessary to give not only his personal or specific name, and the company of which he is a member, but to state also the regiment and brigade to which he belongs.

But, essential as these divisions of an army are, we should scarcely notice them upon visiting its encampment and observing the daily routine of pursuits there. We should see a portion of the men from several different regiments working in the trenches, others standing as sentinels, others perhaps assisting the quartermaster and commissary, others lying idle in their tents, others sick in the hospital; and to give an account of them, we would speak

of them one portion after another, in the manner in which we saw them employed, and not in the order in which their names were entered upon the muster rolls of their respective regiments. So also insects, for practical purposes, group themselves in a wholly different manner from what they do for purely scientific purposes. In a treatise upon economical entomology they naturally divide themselves, in the first instance, into three groups:

1st. The *noxious*, those which are injurious to man.

2d. The *beneficial*, those which are serviceable to him.

3d. The *neutral*, those which are neither injurious or serviceable, at least to any extent whereby they become objects of concern to us.

The second of these divisions embraces two distinct classes of insects, namely, those which are *directly* beneficial, by furnishing us with silk, honey, wax, dyes, medicines, or other valuable substances, and those which are *indirectly* beneficial, by their warring upon and destroying those which are noxious.

But it is the first of these divisions with which we are most deeply interested, as it is our enemies, those who are seeking to inflict injuries upon us, who always give us the most concern, and excite us to the greatest vigilance. And the insects of this division arrange themselves in different classes, as they are detrimental,

1. To fruit trees.
2. To forest trees.
3. To the grass crop of meadows and pastures.
4. To grain and other cultivated field crops.
5. To garden vegetables and flowers.
6. To domestic animals.
7. To man, molesting (1) his person, (2) his clothing, household furniture, &c.

In this place we have space to consider but briefly a few of the most important of these insects, some of those pertaining to the 1st, the 4th and 5th of the above heads. Of these we shall aim to give a few of the leading facts which are most essential to be known, respecting their history, habits and remedies.

Insects which Injure Fruit Trees.

The CURCULIO or PLUM WEEVIL, (*Conotrachelus Nenuphar*, the scientific name given it by the German naturalist HERBST, who first named and described it,) is the worst insect in our country, perhaps with the exception of the wheat midge. It is a native of the United States, and unknown in any other part of the world. It originally subsisted upon the wild plums, crab and thorn apples, on which it still continues to feed as freely as on our cultivated fruits. Among the little red apples with which the thorn bushes are often covered, every boy in our land knows how rare it is to find one which has not a worm in it. That worm is the grub of the Curculio. Its

depredations upon the cultivated fruits began to be observed first in the nectarines and plums around the city of Philadelphia, at least a hundred and twenty years ago. It now attacks nearly all of our important fruits, nectarins, plums, apricots, cherries, peaches, apples, pears, quinces, leaving unmolested only the grapes, gooseberries, currants and others of the small fruits.

This insect is a true weevil, a beetle of the family CURCULIONIDÆ. It is figured in the annexed cut (fig. 1) its natural size, the right hand figure representing it when it is walking, the other as it lies when alarmed and pretending to be dead, showing also the humped appearance of its back. It is of a dark brown or blackish color, with a broad band of white or ochre yellow across the hind part of its back.

Fig. 1.—CURCULIO.

This weevil begins to appear upon the fruit trees about the first of June, or soon after the blossoms have fallen. Immediately after its arrival its presence is indicated by the wounds which begin to be seen upon the surface of the young fruit. It wounds the fruit in two different ways. In feeding, with the minute jaws which are placed at the end of its long trunk or bill, it eats through the skin and into the pulp of the fruit at a particular point, crowding its bill inward farther and farther, until it has finished its meal, when it withdraws its bill, leaving a small hole bored directly inward in the fruit. In the young fruit this wound heals, and in time becomes entirely obliterated. But not so when it is made in fruit that is full grown and ripening. Every one, probably, has often noticed on the surface of a smooth, handsome apple, a round depression or dimple having a discolored dot in its centre. This is the healed wound or scar which remains where one of these holes of the Curculio has been drilled. Thus the injury this wound occasions to apples is but slight; but in plums it is more than serious, it is fatal. The hole perforated in them does not heal, but soon becomes a small rotten spot, and this rot gradually spreads over the whole plum, and worse still, it is invariably communicated to the other plums which happen to hang in contact with the affected one. These facts with respect to the plum I received from ELISHA DORR, Esq., of Albany.

The other kind of wound is made by the Curculio as a nest in which to place its eggs. It is a curved or semi-circular slit, scarcely the tenth of an inch long, deeply cut into the fruit, and the lips of the wound opening slightly apart, give it the shape of a crescent or half moon. Into this wound the insect crowds an egg, though many of these slits are made which have no eggs placed in them, the insect perhaps having been alarmed and interrupted before its work was completed.

The worm which hatches from the egg grows to about three-tenths of an inch in length, and is four times as long as thick. It is white and glossy, with a tawny yellow head, whereby it is readily distinguished from another worm frequently found in the same apple with it, the larva of the codling moth, (*Carpocapsa Pomonella*, Linnæus,) the head of which is black.

This worm mines its way in a meandering track in the fleshy interior of the fruit, and around the central stone or seeds, causing it to wilt and fall to the ground. The blighted fruit begins to drop before the middle of June, and continues to fall for three or four weeks, till never a plum and scarcely an apple is remaining on the trees, whilst the ground underneath many of them is literally covered with the fallen fruit. The worm having finished feeding, leaves the fruit and crawls into the ground, where it lays dormant in its pupa state for a week or more, and then gives out the beetle in its perfect form, about six weeks being required for the insect to complete its growth, and pass through its transformations. Thus those Curculios which are nurtured in the young fruit come out again in their perfect state mostly during the last half of July. As there is no young fruit for them to resort to at that time, where they lay their eggs and what becomes of them from that time till the following June, is unknown.

It was formerly thought that the large wart-like excrescences which grow on the limbs of plum and cherry trees, and which are commonly called "black knots," were produced by this weevil, and many persons still suppose these knobs or knots are caused by the stings or wounds of some insect. But from the particular examinations I have made of this disease, I find at its commencement and during its early stages it shows no puncture or slit in the bark, and no traces, either external or internal, to indicate that an insect has anything to do with producing it. But after the soft spongy substance of these knots has become developed, the Curculio deposits its eggs therein, and its young are nurtured in these fungous excrescences as readily as they are in the fruit of the same trees.

A destroyer of the Curculio, an Ichneumon-fly, whose larva feeds internally upon the larva of the Curculio till it kills it, was obtained from the worms in black knots, by D. W. Beadle, St. Catharines, Canada West, which I figured and described in the Country Gentleman, Oct. 6, 1859, under the name of the Curculio's parasite, (*Sigalphus Curculionis.*) This insect resembles a small ant with wings. It is slightly over three-twentieths of an inch long, of a black color, with orange yellow legs, having the hind feet and shanks, except towards the knee, black.

The fact has several times been reported, that where wild plum trees were growing upon the margin of a stream or pond of water, they have been observed to yield full crops of ripened fruit, when no plums were to be seen on trees standing in other situations. It was hence inferred that this insect had sufficient intelligence to be aware that its progeny would perish if committed to fruit which in falling would drop into the water, and that it therefore avoided such trees. This suggested to me that water placed artificially under a tree might prevent the attacks of this insect. And to test the effect of this measure, I had two large shallow tanks constructed, which I last year placed under two of my apple trees, where much more than half their limbs and foliage was directly over these tanks. Water was placed in them to the

depth of several inches, early in May, and its loss by evaporation was daily replenished. Yet, during the latter part of June the fruit wilted and dropped into these tanks the same that it did elsewhere. The measure did not appear to have the slightest efficacy.

If the facts, therefore, are correctly reported and authentic, as they appear to be, that fruit trees growing along the margin of water are more prolific than they are elsewhere, the only cause to which we are able to impute this is, that a considerable portion of the withered fruit by dropping into the water drowns the larvæ which are nestled in it, whereby this insect is never able to become so multiplied around such trees as it does elsewhere.

This leads us to one of our most important and sure steps for diminishing the numbers of these insects in our own grounds, which is, to pick up all the withered fruit which drops from the trees, and feed it to the swine, or burn or otherwise effectually destroy it. The worm within the fruit, if it happens to be full grown when this drops, will leave it and enter the ground, perhaps within a few hours. Therefore, during the latter part of June and the fore part of July, the ground under the trees should be passed over daily, at least when sufficient air is stirring to cause much of the blasted fruit to fall. Or the same end will be attained, if swine can be pastured in the orchard at this time, to forage under the trees for themselves.

Another remedy, brought to public notice over thirty years ago, by the late David Thomas, not claimed as an effectual but as a partial safeguard against this insect, and the utility of which is attested by long and extensive experience, is the following:—Soon after the blossoms have fallen, when the first wounds of the Curculio begin to be seen upon the young fruit, spread sheets beneath the tree, reaching as far out as the limbs extend, and with the hand if the tree is small, with a wooden mallet if it be large, strike against the body of the tree a blow sufficiently heavy to give the whole tree a sudden jar. To prevent the bark from being bruised when thus struck with a mallet, hold against it, to receive the blow, a piece of carpeting or coarse cloth, wound around the end of a strip of thin board some four inches wide and two feet long. A portion of the weevils, alarmed with this jar of the tree, will drop down upon the sheets and will lie there a short time as if dead; they are readily seen on the white surface, and are easily crushed by pinching them between the thumb and finger. This measure should be resorted to once, twice, or oftener, each day; it should be repeated as often and continued as long as the number of insects obtained attest its utility.

It is by these two measures, picking up the fallen fruit and jarring the trees, that the professional nurserymen and fruit growers all through our country are able every year to secure fair crops of plums, when those to whom they sell trees, having no sufficient leisure to pursue the same course so perseveringly, rarely obtain a ripened plum from their thriftily growing trees.

Could a remedy for the Curculio be discovered—an effectual remedy of easy application—it would be one of the greatest boons our country could receive. I say it advisedly, it would be of more value to the United States than was the discovery of the gold fields of California.

Recently there is much testimony as to the efficacy of the remedy proposed by Mr. Cumings, of the New-York Observer. He directs to thoroughly mix four ounces of sulphur in one pound of whale oil soap, and then dissolve this in twelve gallons of water; to stir well together half a peck of quick lime in four gallons of water, and when it settles pour off the clear liquid and add it to the soap solution, to which four gallons of tolerably strong tobacco water are also to be added. When the first mark of the Curculio is seen upon the young fruit, with a garden syringe drench the foliage thoroughly with this mixture, and if rains should occur within three weeks to wash it off, repeat it. As will be perceived, this mixture is a combination of the several remedies which are in most popular repute as repulsive to insects. The medical faculty will regard it as unnecessarily complicated, its efficacy probably depending upon a part only of the ingredients. I had this year (1862) furnished myself with the articles named, purposing to give them a trial both separately and combined. But the earnestly awaited "first mark of the Curculio" has not appeared on my young fruit this season. My plum and apple trees, which for a decade of years have been, in the words of Hood, "an article producing no returns," are this season bending down under a load of smooth, handsome fruit, only two or three fallen apples having occurred this year, under trees where there have heretofore been bushels. What has caused the Curculio to thus vanish, I am unable to conjecture, nor do I yet know whether it has similarly disappeared over the country generally. This respite from it. however, will in all probability be but temporary.

The Apple-tree Caterpillar, (*Clisiocampa Americana*, Harris,) which in May forms large cobweb-like nests in the forks of the limbs of apple and cherry trees, is well known. Very few persons, however, have any correct idea of the looks of the moth or miller which produces these caterpillars. We therefore present a view of it, its natural size, in the annexed figure 2. It is a stout, thick-bodied moth, of a dull brownish red color, with two straight white bands across its fore wings. It comes abroad the fore part of July, (hatching from pupæ in white oval cocoons, which the caterpillars spin after they have left the trees,) and deposits its eggs in a cluster forming a ring or belt around one of the small limbs near its end. The eggs remain till the latter part of the following April, when they begin to hatch the

Fig. 2.—Moth of Apple-tree Caterpillar.

young caterpillars. These feed on the young tender leaves which are at this time putting forth from their buds, and the caterpillars keep pace with the leaves in their growth, each caterpillar consuming one leaf daily, in instances when I have fed them; and if sulphur be dusted upon the leaves it increases the appetite of the caterpillars, whereby they eat the leaves more greedily and grow more rapidly. Yet it has been published as a remedy for these caterpillars, to bore a hole in the trunk of the tree and fill it with sulphur! The best remedy is, to be on the lookout for the nests of these caterpillars when the season for their appearance arrives, and whenever one of them is discovered with the worms gathered in it and not out upon the limbs feeding, take the first rough stick that is at hand, and press it into the fork of the limb, and draw it up and down upon one side of the fork and the other, until the nest and every worm which can be seen are ground together into fragments.

The FALL WEB-WORM (*Arctia textor*, Harris.) Many persons suppose this to be a second generation of the preceding caterpillars, coming out towards the close of the season, its nests appear so similar. But the moth which produces these worms is smaller and of a milk-white color throughout, without any spots or marks. And the nests, which begin to be seen in August, occur on the ash, willow, and several other trees, as well as on the cherry and apple, and are placed out on the ends of the limbs, and not in their forks; so that to destroy it, it is necessary to cut off so much of the limb as is occupied by the nest and burn it, or thoroughly stamp upon and crush it beneath the sole of the boot.

The APPLE-TREE BORER, (*Saperda bivittata*, Say,) is an insect almost as pernicious to the apple tree itself as the Curculio is to the fruit. This insect is a long-horned beetle of a butternut brown color, with two broad milk-white stripes extending its whole length. The female is represented its natural size in the accompanying cut, (fig. 3,) the male being smaller and more slender. This beetle comes abroad in June, and drops its eggs under the loose scales of the bark, low down near the surface of the earth. The worm which hatches therefrom eats inward through the bark, till it comes to the wood. It there remains, feeding upon the soft outer layers of the wood, and thus excavating a shallow round cavity under the bark the size of a half dollar; though where two, three or more worms are lodged in the same tree, as they always preserve a narrow partition between their cells, one never gnawing into that of another, these cells by crowding upon one another become of an irregular form, and almost girdle the tree. The cell is always filled with worm dust crowded and compacted together, some of which becomes crowded out

Fig. 3.—APPLE-TREE BORER.

through a crack in the bark or a hole made by the worm. And it is by seeing this sawdust-like powder protruding out of the bark that we detect the presence of these borers in the tree. The worm continues to feed and enlarge its cell under the bark for about twelve months, until it has become half grown and is from a half to three-fourths of an inch in length. Its jaws have now acquired sufficient strength for it to attack the solid heart wood of the tree, and it accordingly bores a cylindrical hole from the upper part of its cell, upward in the solid wood, to a length of three or four inches or more, this hole inclining inward towards the centre of the tree, and then curving outward till its upper end comes again to the bark. It then stuffs the upper end of this passage with fine chips or worm dust, and its lower end with short fibres of wood, arranged like curled locks of hair, thus forming an elastic bed on which to repose during its pupa state. These operations being completed, it throws off its larva skin and becomes a pupa, usually at the close of the second summer, or about fifteen months after it hatched from the egg. In this state it lies through the winter, and changes to its perfect form the following spring,, but often continues to lie dormant several weeks after its final change, until the season becomes sufficiently warm for it to come abroad. Awaking then into life and activity, it crawls upward, loosening and pulling down the chips and dust that close the upper end of its burrow, till it reaches the bark. Through this it cuts with its jaws a remarkably smooth round hole of the exact size requisite to enable it to crawl out of the tree. The sexes then pair, and the female deposits another crop of eggs.

The bark and wood over the burrow which this borer makes, always dies, and if the tree survives, it never recovers from the injury. A long, deep groove is formed on the body of the tree, upon the opposite sides of which groove the scales of dead bark are interposed to prevent the wood from uniting together, and this groove becomes more elongated with the growth of the tree each year, till in mature trees it is often two feet or more in length. A specimen in the Museum of the New-York State Agricultural Society, presented by John M. Stevenson, Esq., of Coila, shows, in a most perfect manner, the permanent injury done to trees by this borer. It is a transverse section of the trunk of a large apple tree which had been infested by borers when it was young, and occasionally afterwards. From each of the holes bored by this insect a crack is seen extending outward to the circumference, these cracks radiating like the spokes of a wheel, and being filled their whole length with the black compacted remains of the dead bark which had prevented the wood from closing together.

To repel this beetle from depositing its eggs upon the bark, the tree, the latter part of May, should be rubbed with soft soap, or have some other alkaline substance applied to it. Five years ago I treated half my young trees in this manner, and the following spring not a borer could be found in any of them, while of those to which soap was not applied, the major part had young borers a quarter of an inch long in them, fifteen of these worms

being found in a single small tree. I have continued to apply soap to the same trees each year since, but have occasionally found borers in some of them. I am inclined to think, if soap is applied the latter part of May, and repeated if copious rains occur to wash it off before the end of June, the trees will never be attacked by this insect. Dusting the butts of the trees thickly with air-slaked lime bids fair, from experiments which I have recently commenced, to be more efficacious than the soap. If, notwithstanding these precautions, any worms become established at the root of the tree, they should immediately be ferreted out and destroyed. This can be done much more easily when they are young and small, as they are then lying in or directly under the bark.

PEACH-TREE BORER, (*Trochilium exitiosum*, Say.) The borer in the roots of peach trees is a worm so similar in its appearance and habits to that of the apple tree that many persons conjecture the two to be the same insect. But they are widely different—the one becoming a beetle, the other a moth. This moth comes abroad to deposit its eggs upon the bark the latter part of July and in August. It is of a dark steel blue color, and has considerable resemblance to a wasp. And we are here presented with one of those instances which are common among insects, in which the male and female are so unlike that we should take them to be different species. In the male, (fig. 4,) the wings are clear and glassy, while in the female, (fig. 5,) they are opake, only the middle of the hind pair being transparent. The female also has a bright orange yellow band around the middle of her abdomen, by which she is readily distinguished when flying around the peach trees, as she does, in the clear light of day. The worm which hatches from her eggs bores long slender channels in the roots, both in the bark and the solid wood, causing the gum to exude copiously, whereby this borer is even more destructive to the peach than that of the apple is to that tree. Fortunately its attacks are more readily prevented. The trees should be examined every spring. A glance will show if any gum is exuded between the ground and the root, and if so the worm causing it should be traced out and destroyed. A bank of ashes or slaked lime is then to be placed around the butt of the tree to the height of a few inches, and taken away in autumn. This prevents the moth from getting near the root to deposit her eggs; and it is said that a bank formed of coal ashes, or merely of earth, answers the purpose as effectually as does wood ashes or lime.


Fig. 4.—PEACH-TREE BORER. (Male.)


Fig. 5.—PEACH-TREE BORER. (Female.)

The APPLE BARK-LOUSE, (*Aspidiotus conchiformis*, Gmelin,) makes its

appearance as a little brown scale, one-eighth of an inch long, the shape of an oyster shell, fixed to the smooth bark, resembling a little blister. This scale is the dried remains of the body of the female, covering and protecting her eggs, from a dozen to a hundred of which lie in the cavity under each scale. These eggs hatch the latter part of May, and the young lice diffuse themselves over the bark, appearing as minute white atoms, almost invisible to the eye. They puncture the bark, and suck the sap from it. The females soon fix themselves and become stationary. They die and become overspread with a substance resembling fine blue mold, which, wearing off, the little oyster-shaped scale again appears in July. They sometimes become so multiplied that the bark of the trunk and limbs is everywhere covered and crowded with them, and if the tree is weakened by borers, fire blight or other disease, these bark lice thus multiplying, kill it. In years past, over all the country adjacent to Lake Michigan, every apple tree has been destroyed by this insect. Smearing the bark of infested trees with grease or oil early in June, is a most effectual remedy.

Insects which Injure Grain Crops.

The Wheat Midge, (*Cecidomyia Tritici*, Kirby,) the insect which in this country is commonly but most improperly termed the "weevil," is by far the most important depredator upon our grain. It has been known in Great Britain for more than a hundred years, and has occasionally been quite injurious to the wheat crops of that country. Within a few years past it has also attracted observation in the north part of France, in consequence of the damage it was occasioning in the wheat crops there. In these its native haunts, wherever it appears, it is accompanied by vast numbers of minute black flies, resembling small ants, which are its parasitic destroyers. One of these parasites deposits its eggs in the larva, another in the eggs of the midge, causing them to perish, and hereby this insect is constantly repressed and restrained from multiplying, and is speedily quelled whenever it chances to become numerous.

It was introduced upon this continent, probably, in unthreshed wheat brought to the port of Quebec, and began to attract public notice from its extreme destructiveness to the wheat crop in the northwestern part of Vermont, in the year 1828. From thence it has spread itself over all the free States and Canada, as far west as into Michigan and Indiana, everywhere laying the wheat under contribution for its support, and rendering this crop so uncertain that in all the older parts of the country it has ceased to be a staple product.

This insect is a very small two-winged fly about a third the size of a musketo, which it resembles in its appearance. It is of a bright lemon yellow color, with clear glassy wings. In the annexed cut, (fig. 6.) it is represented as it appears when flying, the small figure underneath showing its natural size; and the following figure, (fig. 7,) shows it with the wings closed over

Fig. 6.—Wheat Midge, Flying.

its back, as it appears when standing or walking about upon the heads of the wheat. It is the female which is here figured. The males are smaller, with antennæ much longer and more slender, and so different in their structure that the two sexes are readily distinguished hereby. Fig. 8 shows part of an antenna of a male, on the left, and of of a female on the right. In the male there are twenty-four globular joints, in pairs, each alternate two joints being placed perceptibly nearer together; in the female, these two joints are united into a single oblong joint, thus making but twelve joints in this sex, each of these joints being encircled with two whirls of hairs.

Fig. 7.—Wheat Midge, Walking.

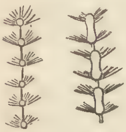


Fig. 8.—Male and Female Antennæ.

These flies come out from the ground each year in the fields where wheat was grown the year before. The sexes pair immediately, and the females then fly away by night in search of the new wheat fields, in which they all soon become gathered. It is a little before the middle of June that they begin to appear, and the females continue more than a month, occupied in placing their eggs between the chaffs of the wheat ears.* They are most active in a moist atmosphere, and cannot endure a dry one. Hence they are only seen at their work on the wheat ears in the night time, when the dews are falling, and on cloudy days. And if the last

Fig. 9.—Ovipositor of Wheat Midge.

* It is when they are traced out to their most minute particulars that the works of Nature become most interesting. The ovipositor, or apparatus by which the midge deposits its eggs between the chaffs of the wheat heads, merits a passing notice in this place. All the accounts hitherto have described this insect as protruding from its body a long, fine, hair-like sting, through which its eggs are passed; and the only two authors, beside myself, who have figured it, have represented it flying, with this hair-like sting appended like a tail to its body. The last summer it occurred to me as a very singular circumstance that, though I had been closely observing this insect for 16 years, I had never seen it with this hair-like sting protruded and visible. Thereupon, a number of careful dissections of the body assured me that no such part exists. Fig. 9 correctly represents this instrument when it is fully extended. The two last joints of the body are here seen, followed by two long tubes which constitute the ovipositor. These tubes shut one into the other, like the joints of a telescope, and are wholly withdrawn into the body when not in use. To deposit the eggs they are extended and crowded like a

half of June be wet and showery, this insect is most numerous and destructive; but if it be remarkably dry, the wheat that year escapes from injury, the insect withdrawing from it, probably to the grass of moist lowland meadows and the margins of streams, in which to rear its young, to return, as they do, into the wheat the next year.

The eggs, two of which are represented in fig. 10, as they appear when highly magnified, hatch minute footless worms or maggots, which soon acquire a bright orange yellow color. These place themselves upon the soft young kernels of the grain as seen, (fig. 11,) which represents a kernel of grain with its chaffs or husks opened apart to show these yellow worms clustered upon it. They abstract the milky juice from the kernels, whereby the latter become shrunken and dwarfish. The worms get their growth in three or four weeks, when they are slightly less than a tenth of an inch long. One of these worms is represented as it appears when crawling, and with its horns extended, (fig. 12,) the small figure on the left hand showing its natural size. As it has no feet it can only adhere to the straw when it is wet. It then moves about upon it with ease, by contracting and elongating itself. The two ends of its body, as they appear when it is lying at rest upon a dry surface, are represented upon the right side of the same figure, the head being drawn in, so that only the ends of its horns are visible. It is when the straw is wet with rain that these worms, having got their growth, leave the wheat heads and crawl down to the ground, where, slightly under the surface, they inclose themselves in minute cocoons, scarcely the size of mustard seeds, in which they remain through the autumn and winter, and till ready to change into flies the following June. A portion of the worms, however, are still remaining in the wheat heads at the time of harvest. These are carried into the barn, where, as no moisture gets to them to quicken them into activity, they lie dormant until the grain is threshed and cleaned, when they drop with other foul matters into the box which gathers the screenings of the fanning mill.


Fig. 10.—Eggs of Wheat Midge.


Fig. 11.—Wheat Chaffs opened, showing the Worms on the Kernel.

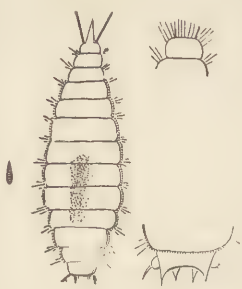


Fig. 12.—Larva of Wheat Midge.

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probe into the crevice between two scales of the chaff. Thus the midge is able to pass its eggs so deeply into those crevices that no spider or other enemy can find and destroy them. A fine beard covers the last joint, which holds it steadily in its place when an egg is passing; and at its end are two minute finger-like appendages, which serve to guide the eggs, one slightly aside from another, whereby several eggs are deposited at one point without withdrawing the ovipositor or changing its position.

With respect to the remedies for this insect, every farmer knows that by late sowing he can prevent his wheat from being headed and in bloom till the season for the midge to deposit its eggs therein has nearly or quite passed by; yet, in thus attempting to raise wheat in any other except the best period of the year for its growth, he is liable to obtain only an inferior crop. It is in our power to do much towards diminishing the numbers of this insect. Whenever the screenings of the fanning mill abound with the yellow larvæ of the midge, they should be burned, or fed under cover to the poultry or swine; they should never be emptied out doors to mature, as they there will, into a swarm of flies, to live at the expense of the wheat the following summer. And those larvæ which leave the wheat heads before harvest, and remain in the fields, tightly wound up and fettered in their cocoons, slightly under the ground, may be destroyed, it is altogether probable, by turning the wheat stubble under with the plow—thus burying them to such a depth that in their efforts to work their way up to the surface, when they break out from their cocoons the following June, they will become exhausted and perish. Thus every man may destroy all these insects which are generated in his own wheat, and hereby materially lessen their ravages on his lands. But unfortunately they breed also in grass, or at least in some situation other than in the wheat, from whence their ranks will always be liable to be replenished.

In America we have now had thirty years' experience with this insect. We have become well acquainted with its history, its transformations and habits. The best remedies for it which we are able to devise and practice, are but partially efficacious. It continues to be as numerous and destructive now as it has been at any previous period. By diminishing the yield of its wheat crops it is occasioning a loss, to the State of New-York alone, of some millions of dollars annually. And this loss will continue until by accident, or by the hand of man, the parasite destroyers of this insect become introduced into this country, when it will disappear, in the same manner that its predecessor and compeer in destructiveness, the Hessian fly, has disappeared, and has almost ceased to be felt as an evil.

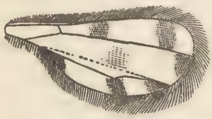


Fig. 13.—Wing of the Spotted-winged Wheat Midge.

The Spotted-winged Wheat Midge, (*Cecidomyia graminis*, Fitch,) is sometimes seen common upon the wheat in company with the common or clear-winged species. It is recognized by the smoky spots upon its wings, which are placed as shown in the annexed figure 13.

The Unfriendly Midge, (*Cecidomyia inimica*, Fitch,) is another species which I have detected, rearing its young in the wheat ears. This fly differs from the two preceding ones, in having its body of a blackish instead of a yellow color, and its larva is white instead of yellow. An account of its transformations will be found in my Sixth Report on Noxious Insects, published in the Trans. N. Y. S. Ag. Soc. for 1860, p. 830.

The Hessian Fly, (*Cecidomyia destructor*, Say,) instead of taking up its abode in the wheat heads and nourishing itself on the kernels like the preceding species, makes its attack at the root and lower part of the stalk, thus destroying not the seed merely, but the whole plant. It is an European insect, and has been detected in Germany, France and Italy, where it at times has committed severe depredations upon the wheat crops. Written accounts, which seem to point to this insect, date as far back as the year 1732. It was brought to this country, probably, in some straw used in package by the Hessian soldiers who landed on Staten Island and the west end of Long Island, August, 1776, but did not become so multiplied as to attract general notice by its injuries in that neighborhood until 1779. And from thence, as a central point, it gradually extended over the country in all directions, advancing at the rate of from ten to twenty miles a year. Most of the wheat-fields were wholly ruined by it within a year or two of its first arrival at a given place, and its devastations usually continued for several years, when they would nearly or quite cease; its parasitic insect enemies probably increasing to such an extent as to almost exterminate it. And from that period to the present time it has ever and anon been reappearing in excessive numbers in one district and another of our country. The present year (1862) it has been very destructive in the lower parts of Illinois, the crop in many wheat-fields having been totally ruined by it.

Fig. 14.—Hessian Fly.

The Hessian fly female is represented, magnified, fig. 14, the cross lines below the figure showing its natural dimensions. It closely resembles a musketo in its appearance, but is a third smaller than that insect, and has no bill suitable for sucking blood. It is black, the joints of its body being faintly marked with reddish. This fly appears in the month of September, when the fall sowed wheat is but a few inches high. Its eggs resemble minute reddish grains, and are of the same appearance when magnified as represented, fig. 10. They are laid in the creases on the upper surface of the leaf. They hatch in about a week, and the minute worm crawls down the sheath of the leaf to its base at the crown of the root below the surface of the ground, where it remains, subsisting upon the juices of the plant, without wounding it, but causing it to wither, turn yellow, and die. Fig. 15 represents, in a very perfect manner, the diseased appearance which the Hessian fly causes in young wheat. Two shoots are there seen growing from the same root; that on the left erect, healthy and vigorous, of a deep green color, whilst that on the right is pale, wilted and dying, swollen at the root from worms there nestled and concealed from view. The worm (fig. 18, the upper figure of

the cut representing its natural size) is a glossy white maggot with a pale green cloud in the centre of its body, and indistinctly showing some fine transverse lines marking its sutures or joints. It attains its growth in about six weeks; its outer skin then dries and hardens into a kind of shell and changes to a chestnut color, whereby it has a marked resemblance to a flax seed. Inside of this shell the white worm (fig. 18) lies through the winter, and the following spring

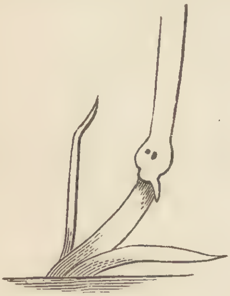


Fig. 16.—Lower Joint of a Diseased Wheat Straw.

Fig. 15.—A Diseased and a Healthy Wheat Plant.

changes to its pupa form, (fig. 19,) in which state it only continues some ten or twelve days, when it crowds itself out of the flax-seed case and immediately throws off its pupa cloak, and is then the fully formed fly, (fig. 14.)

Fig. 17.—Sheath torn off, exposing the worms.

Fig. 18.—Hessian Fly Larva.

Fig. 19.—Hessian Fly Pupa.

Thus the fly comes out again in May, to make another attack upon those shoots of the wheat which it has not already killed. The plants are at this time beginning to start up into stalks. The eggs of the fly thus come to be placed on leaves growing higher up than before, whereby this second brood of worms become nestled at the lower joints of the straw, causing a swelling at the point where they lie, as shown in fig. 16. Fig. 17 is a view of a straw with the outer sheath broken and torn off from the central stalk to expose the worms or flax seeds where they lie, directly above the joint. By their presence the straws

become weakened and bend and fall down from the weight of the heads, and by these broken straws an infested field towards harvest time may be known, it looking as though cattle had passed through it.

The Hessian fly is everywhere followed up and destroyed by two parasitic insects resembling small ants of a black color. One of these, named *Eurytoma destructor* by Mr. SAY, but which I think pertains to the genus *Semiotellus*, is very similar to the insects represented by the following figure 20. It may in common language be designated the Larva-parasite of the Hessian fly. It ascertains where a larva or flax seed of the Hessian fly is lying, and then with its sting pierces the straw and punctures the skin of the larva and inserts an egg therein, from which a minute maggot hatches, which feeds internally upon the larva till it kills it, when, after having completed its transformations, it bores a small hole outwards through the straw and escapes therefrom. Figure 16 shows two of these holes made by parasites which had come from two flax seeds in the straw at this point. Another parasite is much smaller, and inserts four or five of its eggs in a single egg of the Hessian fly, whereby, when the larva hatches from the egg, it has these minute maggots in it, which grow with its growth, and in the end destroy it. It is to the researches of Mr. EDWARD HERRICK, the recently deceased librarian of Yale College, that we are indebted for our knowledge of this egg-parasite of the Hessian fly, and as he has given it no name, I here propose to designate it, in remembrance of him, the *Platygaster Herrickii*, or Herrick's parasite. As the result of his very close and accurate observations upon this subject, Mr. HERRICK states that probably nine-tenths of every generation of the Hessian fly are destroyed by parasites.

There being two generations of the Hessian fly each year, the one coming abroad in May and the other in September, it is only upon fall-sowed wheat that this insect depredates to any serious extent; and it can never make its appearance in those sections of the country where spring wheat exclusively is cultivated. In districts where this fly is numerous, it is scarcely possible to obtain a crop of winter wheat except upon a fertile soil. To elude its attack, late sowing is one of the most easy and successful expedients.

There are four other insects in our country which produce a diseased appearance in the ripening grain, similar to that of the Hessian fly, namely, a swelling in the stalk at one of the lower joints, and a bend at the same place, causing the straw to lean over to one side. One of these insects infests wheat, two of them infest barley, and the fourth attacks rye. The flies are of a shining black color, and are closely alike in their size and shape, but may be distinguished by the colors of their legs. Figure 20 represents a female greatly magnified, the cross lines on the left showing the natural size. They appear about the beginning of June, and with their stings pierce the grain stalks in numerous places, immediately above one of the joints, inserting an egg into each puncture. This causes the stalk to swell and become of a hard, knotty, wood-like texture; and on the surface of the

Fig. 20.—Barley and Joint-worm Flies.

swelling are several slightly elevated, smooth, oval spots, like blisters. On cutting into one of these spots, a cavity or cell is there found, containing a soft pale yellowish or straw-colored maggot, much like that of the Hessian fly, figure 18. But the cell in which this worm lies is perfectly closed, being formed in the substance either of the central stalk or of the sheath which surrounds the stalk, and not in the crevice between the sheath and the stalk where the Hessian fly larva reposes. The affected stalks are stunted and backward in ripening, and if any grain is formed in the ears the kernels are small and shrunken. The worms remain in their cells in the straw till the following spring, when they become flies, and each one gnaws a small hole in the straw, like the perforation of a pin, out of which it crawls.

These insects pertain to the order Hymenoptera, and the family Chalcididæ. They are named and distinguished from each other as follows:

The Black-legged or Massachusetts Barley Fly (*Eurytoma Hordei*, Harris) has all the legs black, with only the knees and feet dull pale yellow. Over thirty years ago this fly for several seasons infested the barley in the northeastern section of Massachusetts, rendering this crop so precarious that its cultivation was to a considerable extent abandoned.

The Joint-worm Fly (*Eurytoma Tritici*, Fitch) differs from the preceding in having the shanks of its fore legs dull pale yellow. The malady which this insect produces in wheat, began to attract notice in the central parts of Virginia fourteen years ago, and the first published accounts of it were given in the Southern Planter of July, and the Albany Cultivator of October, 1851. For several years it continued to be the greatest pest ever known to the wheat in that region, totally destroying the crop in many fields.

The Rye Fly (*Eurytoma Secalis*, Fitch) differs from the joint-worm fly in having the hind shanks as well as the forward ones dull pale yellow, the middle pair only being black. In the valley of the Susquehanna, in Pennsylvania, this fly, by the injury it was doing to the rye, was exciting considerable fears last year (1861) and the year before.

The Yellow-legged or New-York Barley Fly (*Eurytoma flavipes*, Fitch) differs from the three other species in having the legs of a bright honey yellow instead of a black color. For some eight years past this fly

has been infesting the barley in Onondaga and the adjacent counties in central New-York, this being the great barley-growing district of the United States. Chiefly in consequence of this insect the productiveness of this crop has diminished from forty to about twenty bushels per acre, and it threatens to lead to the total abandonment of the cultivation of this grain in that part of the State.

As the worms of these several flies remain in the ripened straw through the autumn and winter, nestled mostly at the lower joints, it would appear that the most practicable mode to destroy them would be, to cut the grain so high up that most of the worms will be left in the stubble of the field, and then, at some dry time in the autumn, setting fire to and burning this stubble.

The Chinch Bug (*Micropus leucopterus*, Say) is one of the greatest pests to the wheat-growers of the southern and many of the western States. It pertains to the order Hemiptera, and family Lygæidæ, and is represented in the cut 21, the small upper figure showing its natural size. To the eye it appears as a small narrow black bug with closed white wings having a black dot on the middle of their outer sides. These bugs insert their beaks into the green succulent vegetation of different kinds and suck the sap therefrom; and in such myriads do they invade the wheat-fields, that in particular spots every stalk is covered and crowded by them, and is pumped dry of its juices, causing the infested portion of a field to become of a white color, and the kernels in the wheat ears to be shrunken and abortive. And when the wheat is harvested these bugs migrate to the nearest field of Indian corn, covering and bleaching a portion of its stalks in the same manner. It appears to be in dry seasons, particularly when two or three dry summers succeed each other, that these bugs become most multiplied and destructive. Their smell and flavor is so disgusting that birds do not molest them, and no remedy for them has yet been discovered.

Fig. 21.—Chinch Bug.

The Angoumois Moth, (*Butalis cerealella*, Olivier) one of the most destructive insects in wheat, barley, oats, and Indian corn, in France, was long ago introduced into the southern States, all over which it has spread and has become fully naturalized. And from thence it is frequently brought to New-York, in cargoes of grain; but, fortunately for us, the climate here appears to be too cold for it to multiply and establish itself. It is only upon the ripe grain that this moth preys, attacking it in the field before harvest,

and continuing to work upon it in the mow and the out-door stack, but being most destructive in the bins of granaries, flouring mills and storehouses. The moth is represented about thrice its natural size in figure 22. It is of a dull yellowish gray, or the color of prepared coffee and milk, with a few black dots sprinkled mostly on the tips of its fore wings. Its eggs are bright orange red, and are laid in clusters upon the kernels of the grain, and hatch in five to seven days. The infant worms are no thicker than a hair. Each selects an unoccupied kernel, into which it bores, the hole being so minute it is invisible to the eye. It thenceforth remains in the kernel, feeding upon the flour, which it wholly consumes, leaving the hull or external shell entire, whereby it appears to the eye to be sound and uninjured; but if gently pressed between the fingers it is found to be soft, and by washing, all the injured kernels are separated, they floating on the water.

Fig. 22.—Angoumois Moth.

Having attained its growth it spins around itself a white cocoon, in which it changes to a pupa and finally to a winged moth. As it now has no jaws to gnaw its way out of the shell, it would perish therein, if the worm had not had the forethought with its jaws to cut a hole through the shell. The moth crowds off the stopper from this hole, and with much exertion pushes itself through the opening. Figure 23 represents it in this act; its body and fore legs being extricated, these serve as props whereby it pulls first to one side and then the other, drawing its wings and hind legs, little by little, out from the hole.

Fig. 23.—Moth coming out from a kernel of grain.

There are two generations of this insect each year, the moths coming forth in the spring and again in autumn. Where one of them obtains access to a bin of stored grain, its progeny continues to multiply therein, until every kernel is consumed. The most effectual method of destroying them is to subject the infested grain to the heat of an oven or of a very hot room. The grain may be heated for a short time to about 190° of Fahrenheit's scale, without losing its germinating powers, and this suffices to kill all the insects and worms in it. Dr. Herpin, of France, has discovered that brisk friction and agitation of the grain will also kill these insects, and has invented an Agitator or Shaking-machine, through which to pass the infested grain, which is reported to be effectual in destroying both the moths and their larvæ and pupæ.

The Grain Aphis (*Aphis Avenæ*, Fabricius) is a species of plant louse,

insects of the Homopterous section of the order HEMIPTERA, and forming the family APHIDÆ. It has long been known in Europe as being at times excessively numerous upon oats, wheat, barley and rye. It has been present in the grain-fields of this country for many years, but its numbers were so very few that no one ever noticed it or was aware we had such an insect here, until the summer of 1861, when, over all the New-England States and the State of New-York except its Western section, and also in the adjacent parts of Canada, it suddenly became so excessively multiplied as to overrun, and in many fields literally swarm upon and smother the growing wheat and oats. The following year it appeared in the same manner over Western New-York, Canada West, Northern Ohio, and at least a portion of Michigan; whilst through all the States where it had been so numerous the year before, it was now so greatly diminished, except in a few places, that it would not have been noticed had it not been closely looked for.

Fig. 24.—GRAIN APHIS. THE WINGED FEMALE.

The winged female of this species is seen, greatly magnified, figure 24, and one of the wingless females, which are always vastly more numerous than the winged ones, is represented in figure 25. Their bodies are but little larger than the head of a pin, and of a grass green color, changing in the middle of summer to flesh red or yellowish red. Their antennæ are black except at their bases; their honey-tubes or horns on the hind part of the body are also black, as are the feet and the ends of the shanks and of the thighs. It is very remarkable that all these insects which I have yet seen (and I suppose I have examined them more closely than any other person has ever done) are females, bringing forth live young. When and under what circumstances males occur, if they ever occur, is yet remaining to be disco-

Fig. 25.—GRAIN APHIS. THE WINGLESS FEMALE.

vered. No males are produced in autumn, as they are with our other kinds of plant lice, and no eggs are laid to carry this species through the winter. In autumn, when the rye and the fall-sowed wheat is a few inches high, the wingless females and their young occur, scattered about singly upon it. And in this state winter overtakes them, and they lie among the leaves of the young grain, frozen under the snow, and return to life with the warmth of the following spring. None of them have wings during the colder portion of the year. About the beginning of June the winged females begin to be produced. These fly away from the fall sowed fields to start colonies upon the spring sowed wheat and oats. As yet they are all scattered about upon the stalks and leaves. But as soon as the heads put forth, they all gather upon them. They fix themselves upon the outside of the chaffs around their base or butt ends, as closely as they can crowd together, thus sucking out the juices which should go to swell and mature the kernels. Hereby the ripened grain is rendered dwarfish and light of weight. In the fields of spring wheat and oats which are latest in ripening, these lice become multiplied to the greatest excess, whereby but a third or a half of an ordinary crop is yielded from the fields which are the worst infested.

The grain aphis brings forth its young mostly in the night time. The rapidity of its multiplication is truly astonishing. I find the winged females usually produce two and the wingless ones four young ones each night, and these mature and commence bearing when they are three days old. Thus, it will be seen; they almost double their numbers daily, and the progeny of a wingless female, if all live, will in twenty days amount to upwards of two millions.

No remedy is yet known for this grain aphis. Fortunately it is but a transitory evil. Nature has provided a number of other insects which are its inveterate foes, which slay and feed upon it. Hence, wherever any species of plant louse becomes numerous, these their destroyers soon become gathered, and rapidly multiply till they overbalance and exterminate it. Among the most common and oftenest noticed of these destroyers of the aphis, is the lady-bug or Coccinella, the larger species of which are the size and shape of a half pea, of a bright red or yellowish color, and ornamented with small black spots. Immense numbers of these are seen at harvest time in all the grain fields where the aphis is numerous. Quite frequently upon the grain heads there will also be noticed here and there an aphis of an unusually large size, and standing in a natural position, but motionless, dead, and faded to the color of brown paper. These have been stung by parasites, of which there are several species whose young are reared within the bodies of these and other plant lice. Flying in the grain fields or alighted upon the stalks, will also be noticed an insect like figure 26, of a grass green color, its four wings appearing like fine gauze or lace and its eyes like burnished gold. This is the Golden-eyed fly, of which there are numerous species, forming the genus *Chrysopa* in the order NEUROPTERA. These species may

be found fully described in my First Report on Noxious Insects, Transactions N. Y. State Ag. Soc., 1854. These flies place their white eggs on the ends of slender, hair-like threads, as shown, figure 27. They may often be seen, one or more, on grain heads infested with the aphis. They hatch a small active worm, which grows to resemble the cut, 28. Its formidable jaws are hollow tubes, with the sharp points of which it grasps and pierces the skin of an aphis and sucks out the juices of its body. Thus one of these worms destroys quite a number of the grain lice at every meal it makes. By such means does nature quell and subdue this grain aphis and all other kinds of plant lice wherever they become numerous.

Fig. 26.—Golden-eyed Fly.

Fig. 27.—Eggs of the Golden-eyed Fly.

Fig. 28.—Larva of the Golden-eyed Fly.

The Grain Weevil (*Calandra granaria*, Linnæus) is a small oblong black beetle, though of a chestnut red tint when it first hatches from the pupa. It is represented its natural size in the upper, and magnified in the lower figure of the annexed cut, 29. This insect, like the Angoumois moth, infests the ripened grain only, the worm residing in the interior of the kernels and consuming the flour, but leaving the hull entire. Another species, the Rice Weevil (*Calandra Oryzæ*, Linnæus) is closely like it, but on its wing covers four red spots may be faintly discerned, these spots becoming more perceptible when the specimen is wet. Both these insects infest stored wheat, barley, rye, oats, Indian corn and rice, and when either of these grains are long kept and become old and stale, it is almost impossible to preserve them from being destroyed by one or the other of these weevils. In the northern States they are mostly confined to the storehouses in our cities. They are unknown in the interior of the country, except as they have been received in seeds distributed by the Patent Office, which have very frequently abounded with these weevils, often to the alarm of the persons who have received them, who have been fearful a new insect enemy was being scattered over our land hereby. As in the case of the Angoumois moth, kiln-drying is the most efficacious mode of arresting the evil and preserving the infested grain.

Fig. 29.—Grain Weevil.

We often hear the wheat midge called the weevil. How wholly unlike a weevil the midge is, will be seen by comparing figure 29 with figures 6 and

7. This grain weevil has been known from time immemorial, and in all parts of the world where the English language is spoken, when the name "weevil" is mentioned, this is the insect which is supposed to be referred to. To call the wheat midge the weevil is an error as gross and flagrant as to call a crow a squirrel. If I were to say, "The squirrels are destroying my corn," who could suppose me to mean that the crows were pulling it up in the field? So also, if I say, "The weevil is destroying my wheat," all the world except my own neighborhood understands me to mean that this little black beetle is infesting my granary. Can a person who conscientiously regards the truth make such a false representation? We must leave off calling the midge the weevil.

In the cultivation of Indian corn, the worst enemy we encounter is the CUT WORM, which by night severs the young plants at or a little above the surface of the earth, and lies concealed during the day slightly within the ground. These worms also cut off the cabbages, beans, and other young tender plants in our gardens. They are so well known that any particular description of them and their habits is unnecessary. These cut worms are the larvæ of several different species of dark colored millers or moths, which pertain for the most part to the genus *Agrotis* in the family NOCTUIDÆ and order LEPIDOPTERA. And as few persons have any definite idea of the kind of millers which breed these worms, we present in cut 30 a figure of one of the most common species, its natural size. This is the Gothic dart moth, *Agrotis subgothica*, Haworth, and more recently named *Agrotis jaculifera* by Guenée. It is one of the millers which in July and August most frequently flies in at open windows in the evening, attracted by the light of the lamp. And the other species are similar to this, though usually of darker and more sombre colors, with the fore wings less diversified with marks and spots.

Fig. 30.—CUT WORM MOTH.

Insects Injurious to Gardens.

The insects most common in our gardens are for the most part so well known that it is unnecessary to present illustrations of but a few of them, or to speak of them in this place, except in a brief, general manner.

The CUCUMBER BUG or Striped yellow beetle, (*Galeruca vittata*, Fabricius,) is nearly a quarter of an inch long, of a bright sulphur yellow color, with a black head and three black stripes on its wing covers. It gnaws the young stalks of the cucumber, squash and melon vines, causing them to wilt and die, sometimes wholly severing the stalks. When approached it spreads its wings and flies away. You will notice it flies off from the vines in a horizontal direction, being unable to rise upward. This habit leads us at

once to a simple and perfectly efficacious mode of protecting the vines from it. Place over each hill a box open at the bottom and top. The beetle alighting upon the young plants, and seeing no opening on either side where it can fly off horizontally if menaced by danger, will not venture to remain there. When the vines grow to rise above the boxes, they are no longer in danger, and the boxes may then be removed and laid aside for use the following year. Dusting the plants with powdered charcoal, or with soot, so often recommended in our agricultural periodicals, is perfectly worthless. I have seen these beetles wallow in and become crocked over with the soot and coal dust, without appearing to regard it in the least.

The Squash Bug pertains to Latreille's genus *Gonocerus*, whereby its correct scientific name is *Gonocerus tristis*, Degeer. It is from a half to nearly three-fourths of an inch long, and is a flat backed, dark brown bug, of a loathsome smell, related to the chinch bug mentioned on a previous page. It occurs on squash, pumpkin, and other vines, in company with the preceding insect, and is equally pernicious to them, puncturing the stalks and leaves and sucking out their juices, hereby causing them to wilt and wither. It begins to lay its eggs on the leaves the latter part of June, and afterwards the whole family of its young is seen clustered together on the under side of a particular leaf. Wherever these are seen the leaf containing them should be cut off and trampled upon till all are destroyed. And when one of the parent bugs is seen on the vines, it should be picked off and treated in the same manner. They are easily found, in consequence of their large size.

The little black Flea Beetle (*Haltica pubescens*, Illiger,) the wavy striped flea beetle (*Haltica striolata*, Illiger,) and a few other similar species, eat numerous small holes in the leaves of cucumbers, cabbages, beans, and other garden plants. Sprinkling the plants occasionally with lime water renders the leaves distasteful to these insects.

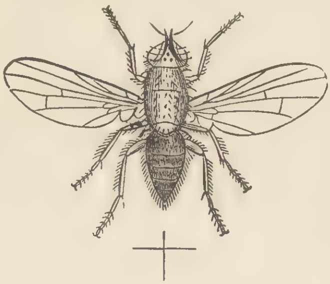


Fig. 31.—The Onion Fly.

The Onion Fly (*Anthomyia Ceparum*, Meigen,) is a small ash gray fly, about half the size of the house-fly. It is represented magnified in fig. 31, the cross lines underneath showing its natural size. This fly lays its eggs on the leaves of the onion close to the ground, most frequently when the plants are quite small. The maggots which hatch therefrom are blunt at one end, and taper to a point at the opposite end. They descend into the bulb, where they feed, and remain during their pupa state, as shown in fig. 32. The bulb becomes rotten soon after they enter it,

Fig. 32—Worms of the Onion-Fly.

and the leaves above ground die and turn yellow. In particular gardens all over our country the onions are all destroyed, year after year, by this fly. Strewing powdered charcoal over the beds is said to be the most successful measure for repelling these flies from them.

The maggots of other species of this same genus *Anthomyia*, bore in the roots of turnips, radishes, cabbages, and lettuce.

Fig. 33.—Rose Bug.

The Rose Bug (*Macrodactylus subspinosus*, Fabricius) is represented its natural size, in fig. 33. It is a buff yellow beetle with shining yellow legs and very long black feet. It appears the latter part of June, and remains out about a month, feeding mostly on the blossoms and leaves of the rose. But at times it becomes immensely multiplied in a particular locality, and then attacks the grape, apple, cherry, plum, and even some of the wild forest trees, stripping them of their fruit and leaves, and sometimes hanging in clusters from their limbs, like a swarm of bees. Hand picking, or, early in the mornings, beating and shaking them from the trees upon sheets and crushing, burning, or otherwise destroying them, is the only remedy for them at present known.

The Asparagus Beetle (*Crioceris Asparagi*, Linnæus) is a European insect most pernicious to the asparagus, which has never been known in this country until this present year (1862) it has made its appearance in Queens county, N. Y., threatening to ruin this most valuable Long Island crop. And unless it is immediately exterminated, there is no doubt it will gradually extend itself over our country, to be a pest to us through all coming time. The beetles and their larvæ feed upon the asparagus through the whole summer season. The annexed cut, 34, gives a view of this insect in its different stages. The beetle is seen its natural size and shape at *a*. It is of a deep green-blue color, ornamented with yellow spots, and places its eggs on the leaves of the plant as represented at *b*, the magnified eggs being seen at *c*. From these hatch a larva of a dull olive or ash gray color, which is represented young at *d*, full grown at *e*, and magnified at *f*. Its pupa state is passed under the ground. Picking off these insects and their young, by hand, and trampling upon them, is the only remedy for them which is known.

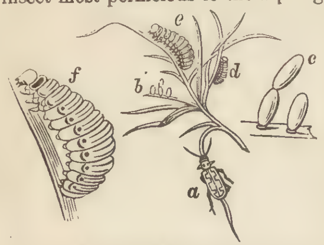


Fig. 34.—Asparagus Beetle, its Eggs and Larva.

Caterpillars.—A quoted writer says:—"I took a pan, large and flat, filled it with burning charcoal, and placed it under a tree—then added a pint of rosin, and two ounces of sulphur. The fumes scattered the worms."

Notes on New and Desirable Flowers.

BY JAMES VICK OF ROCHESTER.

[Written expressly for the Illustrated Annual Register of Rural Affairs.]

EVERY year marks the advent of new and desirable flowers, or the improvement of some of our old and popular varieties, so that those who do not keep their minds informed by reading, and their gardens supplied with choice seeds as they are imported each season, will find themselves far behind their more intelligent and enterprising neighbors. They will show an embarrassing ignorance of the progress of horticultural improvement, and their gardens be destitute of many things of rare beauty. It is not to be supposed that all the novelties we receive from England and the Continent will prove valuable, yet those that are worthless are the exceptions, and with almost every season's importations are received some rare floral treasures. Some of these are the result of hybridization by European florists, while others are brought from Japan, China, Mexico, and other countries, by collectors whose sole business is to obtain and send home beautiful flowers hitherto unknown to European and American florists. Some notes on a few of the most desirable of the new and improved flowers will not be unacceptable, perhaps, to the readers of the ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS.

Fig. 1.—DOUBLE ZINNIA.

Double Zinnia.

Among the modern introductions nothing exceeds in value the Double Zinnia, (fig. 1.) It was first presented to the admiration of European florists by VILMORIN, of Paris. Every attempt to produce double flowers from the single Zinnia had failed, and there was but little hopes of success in this direction. The seeds

from which the double flowers were at last produced were received from the East Indies, by M. GRAZANI, of Bagneres, France, but how they were originated or came to India remains a mystery. The first double flowers seen in this country were grown in 1861, several parties having imported the seed. About one-third only of the plants grown from the imported seed produced double flowers, the others being single or semi-double. The double flowers showed but little variety in color, being of a pinkish red, only varying a little in shade, and lacking the variety and brilliancy of coloring of the old Zinnia elegans. In other respects, however, they were fully up to expectation and the representations of European florists, being perfectly double, finely imbricated, and much larger than represented.

The present season (1862) we observe a great improvement in this flower. The colors are much better, and of greater variety, while two-thirds of the plants grown, either from American or French seed, have double flowers. In a few years we expect the double will show the same variety and and brilliancy of color as the single Zinnia, and then, or even now, for a brilliant and enduring show on the lawn or in the garden, we know of nothing to equal this flower. It seems perfectly adapted to our climate, and will endure drouth or heat; and also to our habits, for it will flourish with the greatest neglect. The plants grow from two to three feet in height, commence flowering early, if grown in a hot-bed and transplanted in June, and will continue until destroyed by frost, all this time giving an abundant show of flowers, no matter what may be the weather, without flagging for a day. The flowers are very enduring, and the same blossom will be in perfection for at least a month, and often six or seven weeks, before beginning to fade.

Seeds may be sown in the open ground as for hardy annuals, but the better way is to start them in a hot-bed or cold-frame and transplant as early as possible. Not one in a thousand will be lost in transplanting.

Japan Pinks.

The first of this family, Dianthus Heddewigii, was shown at the Royal Botanical Society's Exhibition in 1859, the seed having been obtained from Japan by Mr. HEDDEWIG, a nurseryman of St. Petersburg. The plant is of a good compact habit, growing only about a foot in height, and branching freely from the base. The flowers are terminal, borne singly on the branches of the stem, and are single, and two inches in diameter and often more. The colors are the most gorgeous that can be imagined, crimson being the prevailing color, and the the same flower exhibiting the richest possible shades. Some are parti-colored, pink, white and crimson. The centre of each flower is marked with a dark, rich ring.

DIANTHUS LASCIMATUS was obtained from the same source and is somewhat similar, but taller; the flowers are usually larger, with a a deep lacerated or tooth-like fringe at the margin. Since the introduction of these flowers they have been hybridized with our best double China Pinks, and in this way splendid double varieties have been obtained with very large flowers. We have several of these now in flower, obtained under different names, as D. H. Hybridi fl. pl. and D. H. fl. pl. atropurpurea, &c., but while all are beautiful, they do not come sufficiently true to make either worthy of a distinct name, for aside from the labels it would be difficult to tell the difference. DIANTHUS LASCINIATUS, fl. pl., is a good double, and shows the lacerated margin of Lascimatus.

Bidens Atrosanguinea.

This new flower was first announced in Europe last season, and as soon as flowers appeared colored plates were given in the Botanical Magazine, Belgique Horticole, and Gardenflora, while ORTGIES and other florists and botanists represented it as one of the finest additions to our flowering plants. It was discovered by ROEZL, in Mexico. The appearance and habit of the plant are similar to the Dahlia, and indeed, at first sight, it would be considered a dwarf Dahlia. The leaves are

Fig. 2.—BIDENS ATROSANGUINEA.
Flower natural size.)

Fig. 3 —Bidens Atrosanguinea.

very similar, and the flowers resemble a small, single, dark colored Dahlia. Roezl named it Dahila Zimapani, but further investigation has proved that it is a Bidens. The plant is dwarfish in habit, growing only about a foot in height, even with the best of culture, branches very much, and blooms most profusely. The flowers are borne on long, slender stems, from eighteen inches to two feet in height: are single, dark velvety reddish-brown, called in Europe "blood brown," with a cone of disc flowers, like the single Zinnia. The blooms remain fresh a long time, and our plants have kept up a continual succession of flowers since the first of July. It is thought that a few leaves will afford sufficient protection to the roots, and in this way they may be preserved, but this is of little consequence, as the seed germinate readily, and when treated like Ten Week-Stocks or Balsams commence flowering the latter part of June or early in July.

Cuphea Zimapani.

This is also one of ROEZL'S recent introductions, and is the finest of the family. The plant grows to the height of four feet, and branches freely. The flowers are large, of a rich velvety purple, and are borne in great abundance. It is of a straggling habit, and in some situations, where tall, loose-growing plants are admissible, it will be found desirable.

Fig. 4.—STRIPED FRENCH MARIGOLD.

Striped French Marigold.

This Marigold, Tagetes patula nana fl. pl. striata, is a decided acquisition. The plant is of a dwarf, compact habit, the flowers perfectly double, beautifully striped with deep rich brown, upon a bright yellow ground. It is a showy and brilliant flower, entirely unequaled by any other variety. It has very little of the fragrance peculiar to the family, which is so offensive to many. Unfortunately but very few of our plants proved true, not more than one in a dozen, and if it is always to be so unreliable, it will be hardly worthy of culture, for there is nothing so annoying as such disappointments.

Tropeolum.

The Crystal Palace Gem Nasturtium is the best dwarf Tropeolum or Nasturtium we have ever grown. The plant is compact, with a round head, and showing no disposition to run. The flowers are creamy yellow, blotched with red, and are borne pretty well above the leaves. This, with Tom Thumb, (scarlet,) makes a very showy and fragrant bed.

Dwarf Convolvulus.

This class of flowers is growing in favor, and but for the fact that they only show their beauty in the early part of the day, few plants would give a greater show of brilliant blue colors TRI-COLOR MONSTROUS, has exceedingly rich and large dark purple flowers. Sub-Cæruleus is of a very delicate shade of light blue forming a fine contrast with the preceding. The above are new, but all are good.

Oenothera Lamarkiana.

This is a vigorous growing and branching Oenothera, growing from two to three feet in height, with abundance of bright yellow flowers, often more than three inches across. Unfortunately this very showy variety does not open as early in the evening as most other members of the family, and is really a morning flower, like the Convolvulus. This has proved one of the best of the family.

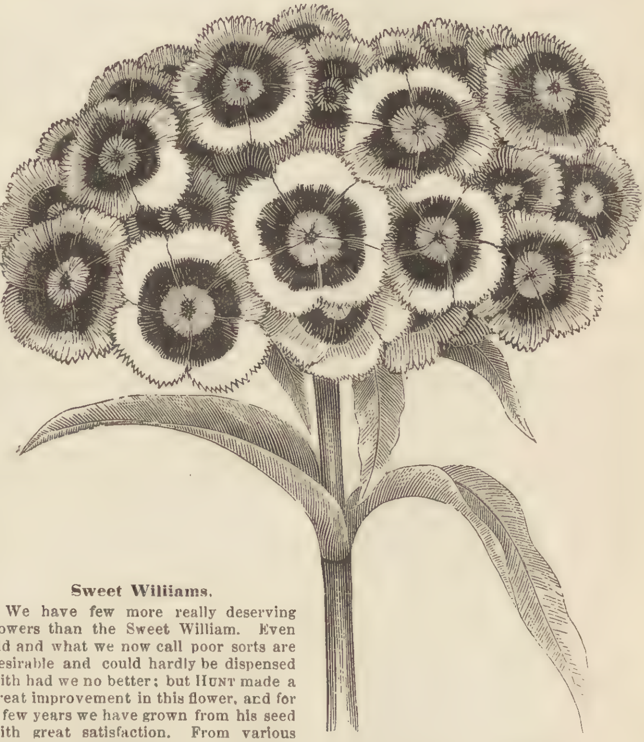


Fig. 5.—HENDERSON'S PERFECTION SWEET WILLIAM.

Sweet Williams.

We have few more really deserving flowers than the Sweet William. Even old and what we now call poor sorts are desirable and could hardly be dispensed with had we no better; but HUNT made a great improvement in this flower, and for a few years we have grown from his seed with great satisfaction. From various sources we learned that Mr. BRAGG, of Slough, had even surpassed HUNT, and that his Sweet Williams were models of perfection. In 1861, E. G. HENDERSON & SONS, the London Seedsmen, succeeded in obtaining his whole stock of seed, and named them HENDERSON'S PERFECTION SWEET WILLIAMS. They were represented as "a decided improvement upon HUNT'S varieties, showing the most brilliant tints, with broader flower lobes, and smooth, even, rose-petaled margin, including pure white ground colors, with rich violet-crimson and violet-purple inner belts or colored circles. Others finely marked with bright cherry-colored belts on snow-white ground. Some flowers blended with the above colors show bright carmine and violet crimson grounds with white margins and picturesque white centers, varying in others to cherry or violet-purple and maroon-crimson, in striking contrast with starry white inner belts." This strain of Sweet Williams we flowered this season, and we can say that they far exceeded expectation, and would justify the most glowing description. The engraving was taken from the earliest specimen flowered, and is inferior in size and form to those that bloomed later in the season. The flowers were in most cases larger than an American quarter, and for delicacy and brilliance of color, perfection of form, and general beauty, equal to the best of the Phloxes. No flower of its season attracted such general and merited attention.

Fig. 6.—Gazania Splendens.

Splendid Gazania.

Gazania Splendens is one of the most showy and beautiful bedding plants lately brought to the notice of the lovers of flowers. The engraving, tho' as fair a representation of the flower, in size and appearance, as a wood-cut can well be—nothing but a colored plate can do it justice. The plant is compact, close branching, and decumbent in habit. The stems, which are green with a reddish tint, bear smooth, glossy, oblong-spathulate leaves, furnished here and there with small single or twin side lobes; these leaves are dark green above and silvery white beneath. The blossom heads, which are from three to four inches in diameter, resembling rich golden orange chrysanthemums with gracefully divided margins, are picturesquely marked at the base of each floret with a broad spot of a rich brown chocolate tint upon a black base, and close beside this is a distinct white spot on the same dark ground. The fine effect of these singular markings may be imagined.

Lychnis Haageana.

After two seasons trial, we are satisfied that this is the most desirable member of the family for general trial. It was produced by Ernst Benary, of Erfurt, Prussia, from

whom we received seeds in the spring of 1861. The plant is dwarfish, and of a straggling habit, and the flowers, which are abundant, are nearly as large as Dianthus Heddewigii, scarlet and white. If treated like a tender annual, and the plants are grown in a frame, with Ten-Week-Stocks, &c., and transplanted in May or June, flowers will be produced in abundance in July, and continue until frost.

Whitlavia Grandiflora, &c.

There seems to be an increasing taste for small blue and white flowers. The great demand of our seedsmen is for the kinds that will produce small and delicate flowers, that will bear cutting well, and are therefore suitable for small hand bouquets. For this purpose the Candytufts are excellent, the New White particularly so, while the Sweet-Scented with small foliage, is very pretty. The Sweet Alyssum is one of the most valuable plants of this class, growing about a foot in height, and covering the ground if planted about a foot apart. The White Sweet Pea is rather large for the purpose, but its fragrance is unequaled, and should be grown in large quantities, for nothing will be in more general demand.

Among the small blue flowers, the Campanula speculum is desirable, which, like all we have named, is an annual, hardy, and free bloomer. Phacelia congesta is a free bloomer, of a light, bright blue, as hardy as a weed. Eutoca viscida is one of the brightest blues that can be imagined. The leaves are clean and healthy in their appearance, but a dullish green. The whole plant has a vigorous look, and grows about a foot in height. The flowers are not sufficiently abundant to suit our taste, but they are of great brilliancy, being of the deepest azure blue. One of the best, if not the best of all our small flowers, is the Whitlavia grandiflora. It cannot be called new, as it has been pretty generally grown in Europe for six or seven years. It commences blossoming when only a few inches in height, and continues during the season, transplants well, endures the hottest, dryest season, and is quite desirable.

Fig. 7.—Whitlavia Grandiflora.

Calliopsis Cardaminifolia.

Last season we obtained seeds of a novelty—Calliopsis cardaminifolia hybrida—the plant being represented as of a pyramidal, globular growth, and covered with thousands of brilliant yellow flowers. The seeds were sown in the spring of 1861, and and the plants produced did not meet our just expectations; but knowing that the Coreopsis cannot be grown in perfection if the seed is sown in the spring, we waited for another trial before condemning this as unworthy of the praise it had received in Europe. This spring we were much surprised to find that every plant of last year had endured the winter, and that each was throwing up a compact mass of leaves and branches. The plants are between two and three feet in height, with a beautiful globular head really covered with thousands of flowers. It has truly a beautiful habit. The present spring, (1862,) we procured seeds of a dark variety, with the same habit, called C. cardaminifolia atrosanguinea.

Fig. 8.—The Gaillardias.

The Gaillardias.

The Gaillardias are not new, and yet are not as generally cultivated as their merits warrant. For making a good and constant show they deserve to be classed with the Phloxes, Petunias, and flowers of this class. The prevailing colors are orange and yellow, and as few of our bedding plants show these colors, the Gaillardias often make the most attractive bed in the garden. The Gaillardias are naturally perennials, but will not endure our hard winters without protection, but when sown in a hot-bed or cold-frame commence flowering soon after transplanting, and continue well through the season. There are several varieties, differing principally in the markings, the prevailing colors being dark red, orange and yellow. Aristata has yellow rays. Bi-color, crimson and yellow. Picta, orange, red and yellow. Alba marginata, dark red, edged with orange white. Josephus, orange-red and yellow. Hybrida grandiflora, of which we give an engraving, and the last named, are perhaps the best, though all are good. The disc of Grandiflora is yellow, but the pistils, which are large, give it a dark brown color; rays red, tipped with yellow. Many of the flowers are much larger than the engraving.

Horticultural Use of Crinoline.

Some years ago Dr. Lindly described a very convenient "machine" for fumigating shrubbery, which he called a parapetticoat. It was made of an umbrella, with a long, sharp, central rod or handle, and around its exterior was sewed so as to hang in suspension, a skirt or petticoat; the umbrella to be spread, and the whole to be placed by means of the sharp handle thrust into the earth, over a plant or shrub, and then sulphur or tobacco, or some other intolerably offensive substance burned under it, to destroy or repel insects.

Winter Gardens without Glass.

The editor of the Gardener's Monthly proposes to bed out for winter a properly arranged assemblage of hardy dwarf evergreens, of which there are now many species—to keep them in boxes, and to remove them in spring, for flowering plants. We may add to this suggestion, that if shrubs bearing scarlet berries, (such as the Euonymus, Celastrus, Pyracantha, &c.,) growing on the ground, could be occasionally intermingled with the foliage of the dark evergreens, the appearance would be very pleasing.

Autumnal Flowers.

Among HARDY PLANTS, with perennial roots, we would name perhaps first, the JAPAL LILIES—the crimson spotted ones are scarcely equaled for delicacy and beauty. Although hardy, they flourish better if the surface of the ground is well covered with forest leaves through winter. PANSIES, which flower through the whole season, are none the less beautiful for being common. They run into innumerable varieties, and the larger ones are two inches in diameter. The newer phloxes make a fine display, especially if in masses, and many of them bloom during the early part of autumn. The same may be said of the ACONITE. Some of the asters make a fine show—and among them we know of none to exceed the A. NOVÆ-ANGLIÆ, or purple New-England aster, for large masses on the more remote parts of lawns, its stems growing several feet high, and its flowers often forming an uninterrupted mass several feet in diameter. The LIATRIS has also a fine purple flower among the larger flowering autumnal plants.

ANNUALS, of course, stand at the head of brilliant showy flowers for autumn. The new CHINA ASTERS excel every thing else for conspicuous display in masses. PHLOX DRUMMONDII, with its numerous varieties, is a general favorite, and blooms till frost destroys it. The same may be said of the VERBENA, when raised yearly from seed and treated as an annual, which is the best way where a green-house is not accessible for wintering the plants, or when a supply cannot be had each spring from a nurseryman—the easiest mode of procuring them.

TENDER PERENNIALS. — For large, rich blooms, the DAHLIA stands eminent. The roots are easily kept in dry sand, in a cool room which never freezes, or in a dry cellar. The GLADIOLUS FLORIBUNDUS is surpassingly beautiful for its freshness and delicacy, and the G. GANDAVENSIS for its richness. The roots are kept as the Dahlia. The tender everblooming ROSES may be made to contribute very largely to the display of autumnal flowers; and green-house plants, strictly such, will add largely to the list.

Manuring Evergreens.

A correspondent of the Gardener's Chronicle speaks of the great success attending the growth of conifers by copious manuring. Spruce trees were planted in manured and also in unmanured ground; the former were at least twice as high, and exhibited a more robust and healthy appearance. An Araucaria, which the writer was told would be poisoned by manure, made a fine and successful growth after being well enriched with half-rotten manure.

Ornamental Shrubs.

A correspondent inquires for a list of a dozen or so of the best hardy ornamental shrubs, the most approved and admired at the present time, and deservedly so, after the test and selection of years. We may name the following as among the best:—

DOUBLE FLOWERING ALMOND—an old and well known favorite—early.

DOUBLE WHITE SPIRÆA (double flowering plum-leaved) — as handsome among snow white flowers, as the almond among pink ones—early.

JAPAN QUINCE—the scarlet excels for a most brilliant display of large, crimson flowers, early in the season, and the blush variety for its delicacy. The bush itself is not handsome.

DEUTZIA GRACILIS—a small shrub, with pure white flowers—makes a fine pot plant for winter blossoming.

PURPLE FRINGE—well known for its singularity and beauty—a symmetrical growth may be given to the bush by proper pruning in the straggling shoots.

BARBERRY—this makes a handsome bush, and the crimson racemes of berries are ornamental in autumn and winter.

HIBISCUS SYRIACUS (commonly called Althea or Althea frutex) although a little tender, is one of the few shrubs that bloom late in summer or early in autumn.

LANCE-LEAVED SPIRÆA—although not equal to some of the preceding for beauty, is valuable for the large display of the mass of white flowers which it bears, and for its hardy growth.

SIBERIAN LILAC is scarcely equaled for the graceful and large masses of purple bloom which it displays early in the season.

There are several other old and new favorites—among the former, the SNOWBALL and TARTARIAN HONEYSUCKLE must not be forgotten; nor the FORSYTHIA and WIEGELA among the latter.

Plants in Bay Windows.

The very neat practice of making small plant cases in bay windows, (and which our readers will find handsomely figured on p. 50 of the Illustrated Annual Register for 1861,) is recommended by T. MEEHAN, who states that a common oil lamp is quite sufficient, with the usual window shutters, to keep out frost during the night or extra severe weather, while the regular day temperature of the room will suffice for that time. This is worth remembering by those who are deterred from attempting to keep house plants by the fear of their being frozen, or of the labor of maintaining a proper temperature by fire heat.

THE KITCHEN GARDEN.

Kitchen Slops and Tomatoes.

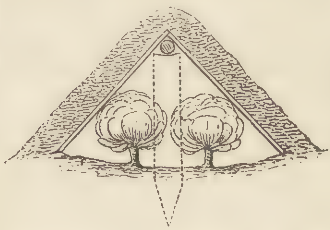
N. K. Meriam, of Grafton Station, Mass., has adopted a simple and cheap expedient for growing early tomatoes and disposing of the slops from the kitchen at one operation. The kitchen yard is in a warm, sheltered place, with a Southern exposure. Barrels are placed near the wall, nearly filled with rich earth. In these, tomato plants are placed early in the season, and may be easily covered up on cold nights. As the plants grow and increase in foliage, and thus throw off large quantities of moisture, the kitchen slops are poured into the barrels for watering the plants. The warmth, moisture, and elements of fertility thus supplied, produce an early growth; while the confinement of the roots in the barrel prevents too much running to stem at the expense of fruit. The barrels should not be water tight, but admit of drainage. Any number of barrels may be thus placed in a row, and be planted with cucumbers and other vegetables. If properly trained, they present a neat and ornamental appearance, and the barrels serve as reservoirs, to get rid of kitchen slops, so often a nuisance about kitchen doors.

Liquid Manure.

This mode of applying manure has one great advantage over the common way of enriching land for gardens. It passes in among all the particles of the soil, and is thus more intimately diffused than any mixing of solid manure in lumps. On all vegetables that require strong fertility, its results are excellent—such plants, for instance, as asparagus, rhubarb, and celery. A correspondent of the Country Gentleman says: "Those who would like to try this system in their garden should sink a hogshead into the earth in a convenient corner of their garden, and liquify guano, hen manure, cow dung, urine, &c., &c., with from six to ten or more times their bulk or weight of house slops, suds or soft water, and after thorough stirring to secure a solution of all the fertilizing elements, allowing the solid or sedimentary portion to settle to the bottom, apply the liquid by a watering can, hydropult, or other apparatus, to the crops after or about sundown."

Heading Cabbages during Winter.

It often happens that many cabbages have not formed heads in autumn on the approach of winter, and these are usually rejected and thrown aside. The mode we have adopted to produce heads from these has been long known to some of our readers, but we discover that it is rarely practiced. A brief description may therefore be useful:—Take up all these plants, and set them as closely as they will stand, in a double row, in their natural position, in a wide and shallow trench. Form an earth roof over them, in the following manner:—Set in a piece of upright plank at each end to support the ridge pole, (shown by the dotted lines in the figure.)



Place a rail or stiff pole on these for the ridge pole, and on this the ends of short pieces of board in the form of a roof. Cover these boards with about six inches of earth; or enough to keep the soil from freezing in which the cabbages stand. This is the whole operation. Nearly all of these will be handsomely headed by spring, and being entirely excluded from light, they will be more delicate both in appearance and flavor, than common cabbage heads. Two hours labor last autumn gave us a fine supply of cabbages for a moderate family nearly through the whole spring.

Failure has sometimes resulted, by not covering the roof with sufficient earth to keep out severe cold. About six inches does well for the Northern States. A sheltered place is best. We have allowed a very small ventilation at the ends, but have not experimented with a view to find how much is best.

Gardens Late in Summer.

Farmers who raise kitchen vegetables, and who do not keep a regular gardener, are apt to neglect their grounds towards the end of summer and early in autumn, and allow weeds to ripen their seeds. Nothing reduces the current expenses of a family, for the outlay, more than a good kitchen garden; but the complaint with many is the labor of keeping it clean—the constant fight with weeds, weeds. Some have adopted the opinion that a quarter-acre garden will grow more weeds than ten acres of farm land, and there is ground for the belief, as some are managed. A few weeds, allowed to perfect seeds, will produce an abundant crop next year; and thus, year after year, the earth becomes filled with them, till the soil of a garden consists of three main ingredients, namely, a soil, naturally; a large amount of manure, artificially; and an immense supply of foul seeds, spontaneously.

Is it not practicable to clear out entirely and totally, the last of the three? Are weeds a necessity? If a garden contains a hundred thousand of them, and ninety-nine thousand are killed by the hoe, why not the remaining thousand? If nine hundred and ninety of this thousand, why not the remaining ten? ☞ THE SOIL OF A GARDEN MAY BE COMPLETELY PURIFIED OF WEEDS AND THEIR SEEDS, greatly reducing the labor of keeping it in order, and largely contributing to a fine growth of the crops. It is easier to keep a garden perfectly clean, than to be engaged in a constant warfare with the weeds. The labor is far less. The reason that it is not done, is the want of care and attention. Nearly all farmers are satisfied if a garden is NEARLY clean. This is the origin of all the trouble—namely, leaving a few weeds to seed the whole ground. The remedy is—eradicate everything—and then, in three days go over again, and eradicate anything that may have shown its head, and so continue the examination every week, weeds or no weeds. One morning every week should be set apart for this special purpose. Unless something of this kind is adopted, the thing will certainly be neglected. And after they are out, continue the process to KEEP them out. It is easier to spend a half hour in a morning once a week in this way, and have good crops, than to spend three days in each week fighting the intruders, and as a consequence getting bad crops.

To keep Squash Bugs off.

Knock the bottoms out of cheese boxes, nail on screen cloth, and set them over the hills. When not in use, pack them away, and one set will last a number of years.

Culture of Asparagus.

Our readers will doubtless remember that we have often urged as a very essential requisite, to give asparagus plants plenty of room—this being more important than to make a very deep and rich artificial bed for them. Dr. KENNICOTT states, in a late Prairie Farmer, that he has a bed set out twenty-four years ago, in rows four feet apart, and cultivated like corn, by horse-power. All that it costs him to supply a table of twenty or more for two months, is less than the expense of a dozen messes of green peas. Any soil, he observes, fit for a premium crop of corn or potatoes, is fit for an asparagus bed, without any preparation. It is annually dressed with manure, in autumn, plowed and forked under in spring.

Securing Celery.

For common family use, it is best to let it remain where it grew, and to cover it. It is difficult to take it up, without more or less injury. To facilitate covering, dig a pretty deep trench for it to grow in—let it be in a sheltered place, where winds will not sweep off the covering, nor cause deep freezing. It must be covered deep, as freezing will spoil the celery. There are three materials for covering—fresh manure, (which may be used for other purposes when spring arrives,) sawdust, and forest leaves The latter are best, but need some protection on each side, (as for instance a row of pea brush stuck into the ground,) and a covering to hold them from blowing away.

Where the subsoil is not fertile, the trench in which the celery is set, should be three feet wide, and three or four inches of old manure spaded and well mixed in before the celery plants are set out, in order that the roots may have a good chance to grow. If a stream of water could be occasionally turned into this trench, to fill it a few inches, it would accelerate the growth.

Usefulness of Toads in Gardens.

At a recent meeting of the Brooklyn Horticultural Society, the subject of toads in gardens was under discussion, when Mr. BURGESS, an "old country gardener of long experience," stated "that thirty years observation had convinced him that it was the snail and not the toad which devoured strawberries and their vines. Most people attributed the destruction to toads, but he was certain that they were harmless. In gardens he considered them of great use, and all gardeners should look upon them as their best friends. Mr. FULLER endorsed all that had been said upon the subject, and he was glad to hear it.

DOMESTIC ANIMALS.

Wintering Animals.

To winter animals profitably, remember that COMFORT is the great saver of flesh, and consequently of food. Feed regularly, that they may not fret off flesh in waiting for a delayed meal, for their stomachs are good chronometers; keep them clean, that they may not be subjected to the constant discomfort of dirt sticking in their hair and on their skins; let their quarters be warm, and especially avoid the annoyance of cold currents sweeping through cracks in boards or under sills on the windward side of barns; let the air they breathe be well ventilated, for no animal can do as well that is taking foul or dirty air into the delicate tissues of its lungs fifty thousand times every twenty-four hours, or at every inspiration. Good wholesome food is cheaper than such as is poor or mouldy. It is more economical to feed in well constructed racks and boxes, than for animals to tread their food under foot, lie upon it, or mix it with mud. Feed often, regularly, and small quantities, that the food may not become unpalatable by lying long in the animal's breath. Always have a good supply of pure water at hand in the yard. And remember the old saying, that "one foot of boards [for shelter] is equal to one pound of beef."

Avoid the common error of trying to winter many animals on little food. By this error much food is consumed with no increase of growth. A few well-fed animals will manufacture a far greater amount of flesh with the same feed, and they will command a much readier market. We recently visited a small farmer, whose whole herd of cattle was only eight; yet we are confident that they would sell for more money than any sixteen of the herds of most of his neighbors. He never tried to see how near he could come to starving them to death without doing it, and did not attempt to feed them on moonshine and sawdust.

Soiling Cattle.

JOSIAH QUINCY, Jr., has been very successful in keeping cattle in stables the year through, and feeding them by soiling. A hundred acre farm, by this means, has and needs no interior fence. The amount of manure thus made, had enabled him to improve the fertility of a poor farm, so that in twenty years the hay crop had increased from 20 tons to 300. His animals are healthy, and he scarcely ever had a sick one. In a well arranged stable, this mode is attended with very little trouble. The cattle are let out into the yard an hour or two, morning and afternoon, but they generally appear glad to return to their quarters. With this management an acre will support three or four cows, enabling him to keep much stock on little land.

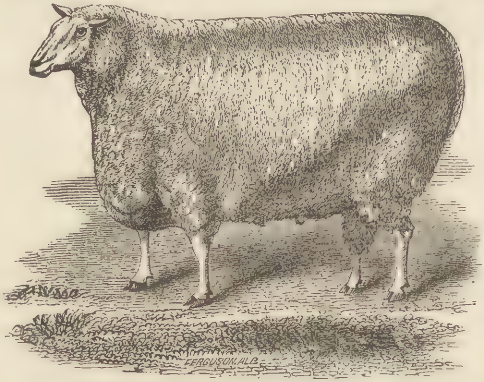
The materials he uses for the feed are grass, oats, corn and barley, cut green. He begins with grass, which lasts nearly till midsummer. Sows the first crop of oats very early in spring, four bushels per acre; the next, half a month later, and the third nearly two weeks later. These furnish food during July and August. In early corn-planting time, he sows Southern corn, and again twice, after intervals of three weeks each. These supply food through more than half of autumn. Several sowings of barley are made in summer, about ten days apart; which give plenty of food until the digging of roots, when the tops are fed. English writers think seven cows may be kept by soiling, for one by the old plan.

It is said that one man will take care of and feed fifty cows. A large supply of carrots for spring feeding would be valuable; and clover for early summer would doubtless be better than grass. Corn sown in furrows three feet apart, at the rate of three bushels per acre, and cultivated (not hoed) once, will yield twice or thrice as much feed per acre as good meadow.

Dimensions of Cattle Stables.

LEVI BARTLETT gives the following measurements for the different parts of his cattle stables, fitted with stanchions, as the result of mature experience:—The stables are 12 feet wide; the platform or floor on which the cattle stand, 5 feet long for oxen, 4½ feet for cows. The sills and top-joists for holding the stanchions, are each 2 by 6 in. Two below and two above are placed side by side, and the stanchions in the space between them, every alternate one being loose at top, so as to open and close again on the animal's neck. The manure gutter is 1 foot wide, immediately behind the platforms; the walk, in the rear of this, 3½ feet wide. Distance between the slats of the stanchions, 8 to 10 inches for oxen, 6 to 8 for cows. For smaller cattle, a strip of board is nailed on the fixed stanchion, so as to reduce the space. One inch by four, is a proper size for the slats, if of oak; or 1½ in. thick, if pine.

The cattle show no objection or aversion to the confinement, but all take their places voluntarily, and all are fastened with one pull of a cord. An extensive dairyman shuts in fifty cows at a stroke, by attaching all the moveable slats to a long wooden bar or rod.



Lincolnshire Sheep.

The above portrait represents a Lincoln sheep bred by Mr. JOHN CLARKE of Long Sutton, an English agriculturist of much prominence, and was one of the three to which the Royal Society's first prize was lately awarded. The engraving of the group, on steel, appeared in a recent volume of the London Farmers' Magazine; and the one of them which we have selected as the subject of our illustration, stands in a position to show the characteristics of the sheep to pretty good advantage. It is chiefly as a wool-producing breed that the Lincolns were formerly esteemed—giving a fleece weighing 8 to 14 lbs., the staple of which was from 10 to 18 inches long. But an infusion perhaps of some Leicester blood, together with the different requirements of the present day, and the progress of turnip farming in Lincolnshire, have effected a considerable modification in the character of these sheep. A great propensity to fatten has been given them, and the engraving shows that the contour of the animal has become full and round, instead of being marked by the flatness and sharpness of former days. The wool, on the other hand, is lighter and shorter than it used to be. Although the mutton produced by this breed is not esteemed by the epicure as equal to the best, it is generally, we believe, a profitable sheep to feed, from its early maturity and rapid accumulation of fat.

Making Pork.

In one respect, farmers commonly show the worst of their management in fattening hogs. These animals appreciate and enjoy cleanliness, yet their owners make them live in dirt, and then charge them with a fondness for filth. This is oppression and slander combined. Every person familiar with their habits, knows that when clean straw beds and other comforts are given them, they are scrupulous to keep them clean.—When shut up in a narrow pen, where they must eat, sleep and live in one apartment, they cannot but be uncomfortable; and such a condition greatly retards their thriving. A "hog pen" has become proverbially a repulsive place; this is the owner's fault, and should never be suffered. There is no reason why it should not be neat and attractive. We hear farmers who raise grain say they have more straw than they can use, while at the same moment their fattening hogs have not enough of it to make a dry and clean bed.

Animals can never thrive well unless kept clean. The rule applies to swine as well as to horses. Every one knows that a well groomed horse is better than a neglected one with a shabby coat. Nearly the same result has been found when this treatment is applied to swine. Let every manager lay down this rule, that A HOG PEN SHOULD NEVER BE DISTINGUISHED BY ITS ODOR TWENTY FEET DISTANT. The sleeping apartments should be separate, and be perfectly clean and dry. The other portion should be cleaned out at least twice a day, and the manure at once mixed with muck, loam, coal ashes, &c., to make compost and destroy the odor, which is as injurious to the health of swine to breathe, as it is to men and women. It is not necessary that a piggery should cost five hundred dollars that it may be kept in splendid order; a cheap and simple structure may be subjected to the most perfect system of cleanliness.

The satisfaction it will afford to the owner, the comfort to the occupant, and the profits to the purse, will be a three-fold compensation.

Fattening Hogs in Warm and Cold Weather.

A correspondent of the Ohio Farmer, writing from Duncan's Falls, gives an account of an experiment made with one hundred hogs, averaging two hundred pounds each, and placed in nine large covered pens, with plank floors and troughs. They were fed as follows:

"The corn was ground up, cob and all, in one of the "Little Giant" steam mills; steamed and fed at 6 and 9 A. M., 12 M., 3 and 6 P. M., or five times a day, all they could eat, and in exactly one week they were weighed again, the corn they had eaten having been weighed also, and calling 70 lbs. a bushel, and pork as before, (4c. gross,) it was equal to 80c, per bushel for corn. The weather was quite warm here for the season of the year. The first week in November I tried the same experiment on the same lot of hogs, and the corn only brought 62 cents per bushel, the weather being colder. The third week, same month, with same lot of hogs, corn brought 40 cents, and the weather still getting colder. The fourth week same as above, corn brought 26 cents; weather still colder."

This lot of hogs were sold off the last of November, and another lot of hogs put up, which had been fed in the field on corn in the cob.

"This lot was weighed and fed as above, the five weeks of December, and the corn fed averaged 26 cents a bushel, the weather being about the same as the last. This lot was tried again in the middle of January, the corn fed for that week averaging only 5 cents per bushel; at that time the thermometer stood at zero. This same lot was tried again and just held their own, the thermometer being below zero, sometimes as low as 10 degrees."

From these facts the writer comes to the sound conclusion that "it will not pay, as a general thing, to feed corn to hogs after the middle of November," unless the price is very low. It will not pay to find fuel in the shape of corn, to keep hogs or other stock warm in winter. We should either fatten early, or provide comfortable shelter and accommodations for our swine, &c."

Sustenance of Animals.

In good farming districts, an acre of meadow, and two acres of pasture, will keep a horse or cow the year through. The size of the animal, and fertility of the land, will vary the result. In hilly dairy districts, five acres are often required for both. Eight merino sheep will consume about as much as one good cow.

To make Hens Lay in Winter.

There is an inquiry which we may as well answer at the present time—"How shall we manage with our hens in order to have them continue to lay in winter, the season when eggs are scarce and sell at the highest price?" The most practical mode that occurs to us would be to confine the earliest pullets after they are two or three months old, feed them well, and keep them until the first of October, when they should be allowed full liberty. A week or ten days afterwards they should be confined in a warm, dry room, where the vicissitudes of the weather and storms will not reach them. They may now be allowed a spacious enclosure, in company with the cocks from the former year's broods, and thus kept for several weeks more. They will soon begin to lay, and continue to do so—not every day, however—until the spring following. The number of eggs to be expected in winter, compared with warm weather, will not amount to more than three-fourths, but the difference between 12 and 28 or 30 cents a dozen, will equalize and compensate for the receipts of those in summer.

The condition under which the laying hens can be protracted to the fullest natural extent, are systematic feeding with various kinds of grain, animal food, broken oyster-shells, old lime mortar, gravel, and plenty of clear and fresh water; warmth in the end of the fall and winter; cleanliness in their house and roosting places.

We have known some persons so careful in this matter as to dig into banks facing the south or southeast, and form rooms for them there, with glazed doors and windows in front, to give sufficient light and heat from the sun, where they can have proper heat, and always a supply of earth, so essential for dusting themselves. In mild weather they may be let out and enjoy their liberty, but in cold and stormy weather the closer they are kept the better. Under such treatment we may safely look for a plentiful supply of eggs at all seasons. C. N. BEMENT.

To Prevent Hens Eating Eggs

S. E. TODD succeeds well by the following mode:—Empty nail kegs (large enough to hold 100 lbs. of nails) are sawed in two, and each half makes a hen's nest. The heads are knocked out, and a piece of cloth nailed on for a bottom. These are nailed about 4 feet above the floor. Hens on these nests are hid from below, and will not be molested or robbed; and they cannot reach their own eggs while standing on the edge—and while on the nest there is not room to get at them.

NOTES ABOUT MANURES.

Extending the Area of Fertility.

T. C. Peters stated an interesting experiment performed on a streak of poor land in Genesee county, by a German, who had bought three acres. It was so poor that it would not grow grass. He sunk an old barrel, and filled it with all the slops of the house. When it became strong, it was spread over a small piece of land, and the barrel was filled again. A quarter of an acre was thus enriched and planted with cabbages, which in turn were enriched by the successive contents of the barrel. A fine crop was the result, and these cabbages were fed to a cow, all the stock the owner kept, and the manure was applied to the soil. The next year over half an acre was enriched; and the poor three-acre farm has since grown into fifty very productive acres.

The Manure Crop.

Josiah Quincy, Jr., has remarked that the most valuable crop he raises is his manure crop. He soils his cattle, and each cow produces 3½ cords of solid, and 3 cords of liquid manure, or 6½ in all. He uses twice as much muck to mix with it—making 20 cords in all. Five to eight miles from Boston, such manure is worth five to eight dollars a cord. From this estimate, he has come to the conclusion that a cow's manure may be made as valuable as her milk.

Manuring for Corn in Autumn.

We noticed some time ago the excellent practice of J. Beatty & Sons, of Cayuga county, in applying the manure for their corn the previous autumn, to grass land, the sod to be inverted just before planting. One of the best cornfields we have any where seen this year, is a field thus treated. It has since been husked and measured; the product is rather over seventy-five bushels of shelled corn per acre. Another portion of the same field was treated alike in every respect, with the exception of applying the manure in spring. The crop is much inferior to the other part.

Manuring Oats.

Hiram Mills, of Martinsburgh, N.Y., sowed six acres of oats in 1859, and manured one acre of the six with 12 loads of horse manure. The manured acre yielded about double any other acre in the field. The field afforded an average of 43 bushels per acre, and had been rather exhausted previously.

Application of Manures.

The following conclusions were adopted at the discussions on manures, at the State Fair at Watertown:—

1. Manure which consists chiefly of the droppings of animals, should be applied as soon as practicable to the soil.
2. Manure consisting largely of straw, cornstalks, or other fibrous matter, should be first rotted to become fine.
3. Manure should be applied at or near the surface of the soil, or should be slightly buried.
4. For hoed crops, and especially for corn crops, it may be buried deeper than for straw crops.

Lime as Manure.

As the effects of lime last several years, it makes very little difference at what season it is applied, provided it is well pulverised, so that it may be evenly spread, and not in lumps, which can be of very little use. It cannot evaporate—it may sink into the soil, if copious and long continued rains occur before it becomes converted to a carbonate, which must be in a few days at furthest. After that, the carbonic acid brought down in rain, may dissolve it very slowly and in almost infinitessimal portions. The fact that the effect of a dressing of lime is sometimes known to last twenty years, shows that it is not easily carried off. If sown on grass, nothing further is necessary; if on plowed land, harrowing may serve to mix it with the soil.

Manuring Wheat.

In answer to the question, "What time ought soils for wheat to be manured?" the Ohio Farmer says:—"It is usually best, if a large supply of manure is applied, to manure the previous crop. By this means it is thoroughly incorporated with the soil, and has time to become well decomposed. If it is quite rotten, it may be applied previously to the fall plowing; or, if it is thought best, apply it to the surface after the plowing. The wheat ought to have the advantage of the application during its fall growth. If the roots are well set before winter, there is little danger from winter-killing, and the plant, in spring, is ready to make a rapid growth. Heavy manuring of wheat at the time of sowing, with crude manures, is not advisable."

☞ The best manures for fruit trees, under usual circumstances, are composts made of stable manure, turf, muck, or loam, with a small quantity of ashes, and still less lime.

VALUABLE SUGGESTIONS.

What Young People should Know.

☞ THE BEST INHERITANCE THAT PARENTS CAN LEAVE THEIR CHILDREN, IS THE ABILITY TO HELP AND TAKE CARE OF THEMSELVES. ☜ This is better than a hundred thousand dollars apiece. In any trouble or difficulty, they will have two excellent servants ready, in the shape of their two hands Those who can do nothing, and have to be waited on, are helpless, and easily disheartened at the misfortunes of life. Those who are active and handy, meet troubles with a cheerful face, and soon surmount them. Let young people therefore, learn to do as many different useful things as possible.

EVERY FARMER'S BOY should know how, sooner or later,

1. To dress himself, black his own shoes, cut his brother's hair, wind a watch, sew on a button, make a bed, and keep all his clothes in perfect order, and neatly in place.
2. To harness a horse, grease a wagon, and drive a team.
3. To carve, and wait on table.
4. To milk the cows, shear the sheep, and dress a veal or mutton.
5. To reckon money and keep accounts accurately, and according to good book-keeping rules.
6. To write a neat, appropriate, briefly expressed business letter, in a good hand, and fold and superscribe it properly; and write contracts.
7. To plow, sow grain and grass seed, drive a mowing machine, swing a scythe, build a neat stack, and pitch hay.
8. To put up a package, build a fire, whitewash a wall, mend broken tools, and regulate a clock.

There are many other things which would render boys more useful to themselves and others—these are merely a specimen. But the young man who can do all these things well, and who is ready at all times to assist others, and be useful to his mother and sisters, will command far more respect and esteem, than if he knew merely how to drive fast horses, smoke segars, play cards, and talk nonsense to foolish young ladies at parties.

EVERY GIRL should know how,

1. To sew and knit.
2. To mend clothes neatly.
3. To make beds.
4. To dress her own hair.
5. To wash dishes and sweep carpets.
6. To trim lamps.
7. To make good bread, and perform all plain cooking.
8. To keep her room, closets and drawers, neatly in order.
9. To work a sewing machine.
10. To make good butter and good cheese.
11. To make a dress, and children's clothes.
12. To keep accounts, and calculate interest.
13. To write, fold, and superscribe letters properly.
14. To nurse the sick efficiently, and not faint at the sight of a drop of blood.
15. To be ready to render efficient aid and comfort to those in trouble, in an unostentatious way.
16. To receive and entertain visitors when her mother is sick or absent.

A young lady who can do all these things well, and who is always ready to render aid to the afflicted, and to mitigate the perplexities of those about her, will bring more comfort to others and happiness to herself, and be mose esteemed, than if she only knew how to dance, simper, sing, and play on the piano.

Thoroughness.

This is the great secret of success. The thorough farmer has everything in good order. He erects substantial buildings, that they may not need repairs every year—he builds good fences, that do not educate cattle to jump—he takes time by the forelock and has tools in good repair, and horses in good order, cattle in fine condition, everything neat and snug about his premises, and thus saves the ten-fold extra labor resulting from mismanagement and confusion. His two leading rules are:—"Do everything well;" and "Never put off till to-morrow what may be done to-day."

How to Make Young Farmers.

Charge your boys early with as much responsibility as practicable. That will develope the activity of their minds. If you keep them in stupid drudgery, they will always be stupid. Throw important trusts upon them, and they will soon be prepared for them. No matter if some loss does occasionally happen. It is better to lose a hundred or even a thousand dollars, a few times, if by so doing you can bring your sons up to make ten times this sum. Parents are so unwilling to give up control of anything, that their boys are always children. It is an old remark, that smart mothers have worth-

less daughters—the reason is obvious—they themselves take the heavy end of everything, "because they can do it quickest or easiest" at that moment, and thus spoil their girls.

Borrowing and Lending.

This is poor business to both parties. The proverb, "the borrower is servant to the lender," is now often reversed. Owners of tools are excessively annoyed by hunting up what some one has borrowed—often to more than their value. Never lend a tool, unless the borrower will promise to bring it back "to-day." And if he does not, go for it at the moment it is due. This will show him that you expect promptness, which will do him a substantial kindness by teaching him good manners, and you will have the tool ready at hand the moment it is wanted.

DOMESTIC ECONOMY.

Household Conveniences.

In the ILLUSTRATED ANNUAL REGISTER for 1862, are given directions for the arrangement of farm tools in the tool house, so as not only to present a neat appearance, but to give an exact place for everything, and to have everything in its place; and the hand can be laid upon any tool in a moment. We propose to suggest something of the kind for the different articles that are commonly seen in the living-room of the dwelling, stowed away in the closet.

Every good housewife has neatly arranged cupboards and dish closets. Everything has its appropriate shelf, and division. But there are other things for which provision should be made—and especially is the interior of a closet not always a picture of perfect order and neatness. A pile of books is sometimes seen in one part of a dining room, a few newspapers in another, and a pair of shoes in a third. Now we do not propose to give minute directions for disposing of everything that ever finds its way into the house, but offering briefly a few suggestions, that may lead to other similar suggestions in the mind of the housekeeper, and sometimes important improvements may possibly be made.

The inside of a closet is sometimes a mass of confusion. Half a dozen garments are hung promiscuously on one hook or nail; others are thrown down on the floor, among heaps of shoes, boots and overshoes. There is no satisfaction in witnessing such medleys. If there are no shelves in the closet, provide a regular row of brass hooks around the interior, and allow but one article to occupy each. Let one side be appropriated to one kind, and another side to another kind, having all systematically arranged; and it may assist in perfecting this arrangement to write neatly and distinctly the name of each article on a small slip of white, pink, or green pasteboard, and attach it by two small tacks over each hook. Then provide a row of shoe pockets near the bottom, or on the inside of the door. These are made by taking a piece of worsted, brown muslin or calico, making it into a bag wide enough to reach across the side of the closet or door, dividing it into several compartments by vertical seams, and then tacking the upper edge to the wall or door. Vertical strips of narrow braid tacked against the wall may serve for making the compartments. They will each receive a pair of shoes, and should not quite cover the whole of the shoe, but leave a small portion projecting, that they may be seen, and be easily withdrawn. If made of worsted, and trimmed with colored braid, they will have a neat appearance. It is a good rule to deposit nothing on the closet floor, where it is sure to interfere with sweeping, and usually to retain or conceal some dirt.

A DIVAN may be made by covering a good strong box a yard long, or a good well selected shoe-box will do for this purpose. The lid should be on hinges, and the top covered with a cushion nailed to it. This will make a convenient and comfortable seat for the sitting room. The interior should be divided into several compartments, and may be used for keeping various articles in. One part may be for shoes or overshoes, another for cast-away newspapers, &c., but whatever is kept within, let them be in neat condition, and handsomely arranged. The habit of carelessly stuffing anything away out of sight, in hidden places, is a bad one, and will lead to careless habits elsewhere, or is the result of such bad habits. Whatever is done, whether concealed or otherwise, let it be neatly and well done.

Those who write many letters should have a cabinet expressly for arranging and keeping them. If nothing is already made and provided, have a carpenter or cabinet maker construct one as follows, which need not cost more than two or three dollars, with a handsome finish, and varnished. A common or medium sized letter is 3 inches wide and 5½

inches long; a small cupboard or cabinet, therefore, that is 6 or 7 inches deep from front to rear, inside, 14 inches wide, and 20 or 24 inches high, may be divided into 24 compartments or pigeon boxes, four in width and six in height—or one for each letter of the alphabet. Some of the letters, such as X or Z, will scarcely need a separate place, and one may be marked "Unanswered Letters." As soon as a letter is read, place it in the last named compartment—when answered, mark on the end of the envelope, outside, the name of the writer, the date, and briefly the contents or subject, and place it in its proper box. Any time within a year, each may be quickly found, by simply observing the first letter of the writer's name. When the year is up, pin up these letters in strong paper bands, mark the letter of the alphabet and year outside, and pack them away till they are outlawed.

It often happens—much oftener than it don't—that housekeepers have work-baskets that are a sort of omnibus, containing a miscellaneous and confused mass of all sorts of odds and ends—plenty of odds, and all sorts of ends—such as buttons, needle papers, balls of yarn, half-knit stockings, tangled skeins of silk, balls of beeswax, scissors, spools of thread, paper patterns, crooked pins, &c., &c. To find anything, the owner tumbles the whole over and over, and when out of patience turns all the contents on the table and searches the pile. A better way is to procure a basket made with compartments, or insert divisions of thin boards, or thick pasteboard. These, if covered with strong colored paper, will give a neat appearance. A circular work-basket, with a row of small compartments around the inside for small articles, and a larger space in the center for the rest, is very convenient. These smaller compartments may be made by dividing a worsted lining, by setting in pieces of wood or pasteboard, all pointing toward the center of the basket. If of wood, they are secured by means of very small tacks driven through a strip of narrow colored braid set on the edge of each piece of wood; if of pasteboard, they are sewed in.

There are many other contrivances that will suggest themselves to every neat and ingenious housekeeper. If any one thinks it too much "trouble" to provide all these, let her go through with a fair calculation of the time spent every year in hunting through her work-basket to find a missing article; in searching for a lost overshoe; in clearing up the scattered items of a sitting-room when company is coming in; or in long searches for some particular letter in a large drawer full. Scarcely a day passes but more or less time is wasted in this way, amounting to many days yearly; while the satisfaction and saving of vexation by a perfect system and arrangement throughout, are much greater than the saving of time.

Making Pickles.

Cut the cucumbers from the vine by means of scissors or a sharp knife, so as not to tear the end, as would be the case if merely plucked by hand. Wash them in cold water and then lay them in the bottom of a barrel or jar, into which a layer of salt has been previously deposited, so that when successive layers of cucumbers and salt are made, the former will be imbedded in salt, the moisture which covers them tending to dissolve the salt, and convert it to brine. They may remain a long time in this condition—many keep them thus until sold in market. To finish the pickling process, take a quantity of good vinegar, but not too sharp or it will destroy the texture of the cucumbers, and give it the flavor of spices, by placing equal quantities of cloves, red and black pepper in a bag, so as to give about half a teacupful of this mixture to a gallon of vinegar, both to be boiled together. Then, having previously removed the pickles from the salt, and soaked them about eight or nine days in fresh water, changing the water each day, pour the hot vinegar, spices, pepper, bag and all, over the cucumbers, and in two weeks they will be ready for use. Some who make very sharp pickles, pour off the first vinegar, and make a second addition, keeping the first liquor for the next batch.

Making Sausages.

The following directions were furnished by the COUNTRY GENTLEMAN, in answer to an inquiry. A female correspondent of that paper wrote, a few months afterward: "That recipe alone is worth a year's subscription to the COUNTRY GENTLEMAN, to any mistress of a farm house. I made 175 lbs. of sausages in careful conformity with its directions, and they have been pronounced by all partakers as of unrivaled excellence in flavor and seasoning."

First, procure a good machine for cutting sausages, instead of doing it by the very tiresome old mode of chopping it by hand. Good ones may be had for some two or three dollars. Then, to every 100 pounds of the chopped meat, add two and a half pounds of salt, eight ounces of sage and ten of pepper—and mix all the ingredients thoroughly. It is a common way among housekeepers to "cut and try"—that is, add a little more salt, and a little more pepper and sage, tasting, and re-tasting, and calling in the

aid of the palates of others, till the thing has too much pepper and salt, and is probably spoiled. The above rule is simple, easy, and good.

The Universal Clothes Wringer.

Many trials of this machine have fully established its value. The clothes pass between two rollers covered with India rubber, and are thus made so dry that they will not moisten dry paper, by a very easy motion of the handle. The machine is screwed to the side of a wash-tub, out of which the dripping clothes pass dry into the basket. The one which has gearing to turn both rollers, instead of one being turned merely by the friction of the other, is the only one which should be selected.

Universal Clothes Wringer.

Cellars.

Farmers will soon fill up their cellars with fruit and vegetables, to remain during a part or the whole of the winter. These apartments should therefore be first put in perfect order before receiving their supplies.

We visited, some time ago, the residence of a friend who had given as much attention to the finishing and arranging of his cellar as to that of any other part of his house. It was more worthy of a visit than the finest drawing-rooms with rosewood furniture and Wilton carpets. In the first place, the walls were built in the smoothest and most substantial manner; the floors were covered with the best water-lime cement, now as hard as flagging, and as smooth as planed boards; the cellar was divided into apartments, one for vegetables, another for fruit another still for provisions, a fourth for the dairy, and a fifth for coal and furnace—for the cellar extended under the whole house kitchen and all. In the vegetable apartment bins were made in the middle, so as to have a passage around them, and in these bins the vegetables were placed, some with only a cover, and others packed in sand, or in moss. Nearly dry and fine moss was preferred to anything else for packing beets, turnips, parsnips and cabbages. The bins were not made of rough boards, as generally seen but were planed and painted, and the whole presented the neatest appearance. The fruit shelves were, in a similar manner, made of planed and painted material, with a passage all around them, both for ventilation and to allow the attendant to assort them frequently.

The partitions between the different apartments were brick walls, and each one was easily accessible, both from the outside large door and from the kitchen.

How much better is such a cellar as this, than those too frequently met with, low, damp and unpleasant, with a pile of dirty potatoes in one corner, a bin of half broken boards in another, partly filled with half rotten apples; a few scattered cabbage heads lying on the wet earth; and a general medley occupying the rest of the space.

Bottling Cherries.

A correspondent in the Genesee Farmer gives the following simple and clear directions:—Take the common sour cherry, stone them, and fill any bottles that you may have. Set them into warm water on the stove, and gradually increase the heat until the air is expelled from the bottles. It will be necessary to have some reserved cherries to fill the bottles, as they shrink very much, and there must be no space between the fruit and the cork. Put in the corks while in the water, and seal them immediately after they are taken out. Stoning the cherries is quite a tedious process, but the rest of the work can be done very rapidly. A dozen bottles can be filled and sealed in two hours. In this way, you can have cherry pies and puddings all winter. There is no fruit that keeps better than cherries, and after being prepared in this way they are much better when stewed with half a pound of sugar to one pound of fruit than the richest preserves.

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